TECHNOLOGY DEPT.

THE INSTITUTE OF PETROLEUM REVIEW

PUBLIC LIBRARY
APR 29 1957
DETROIT

April 1957

ONE SHILLING AND SIXPENCE

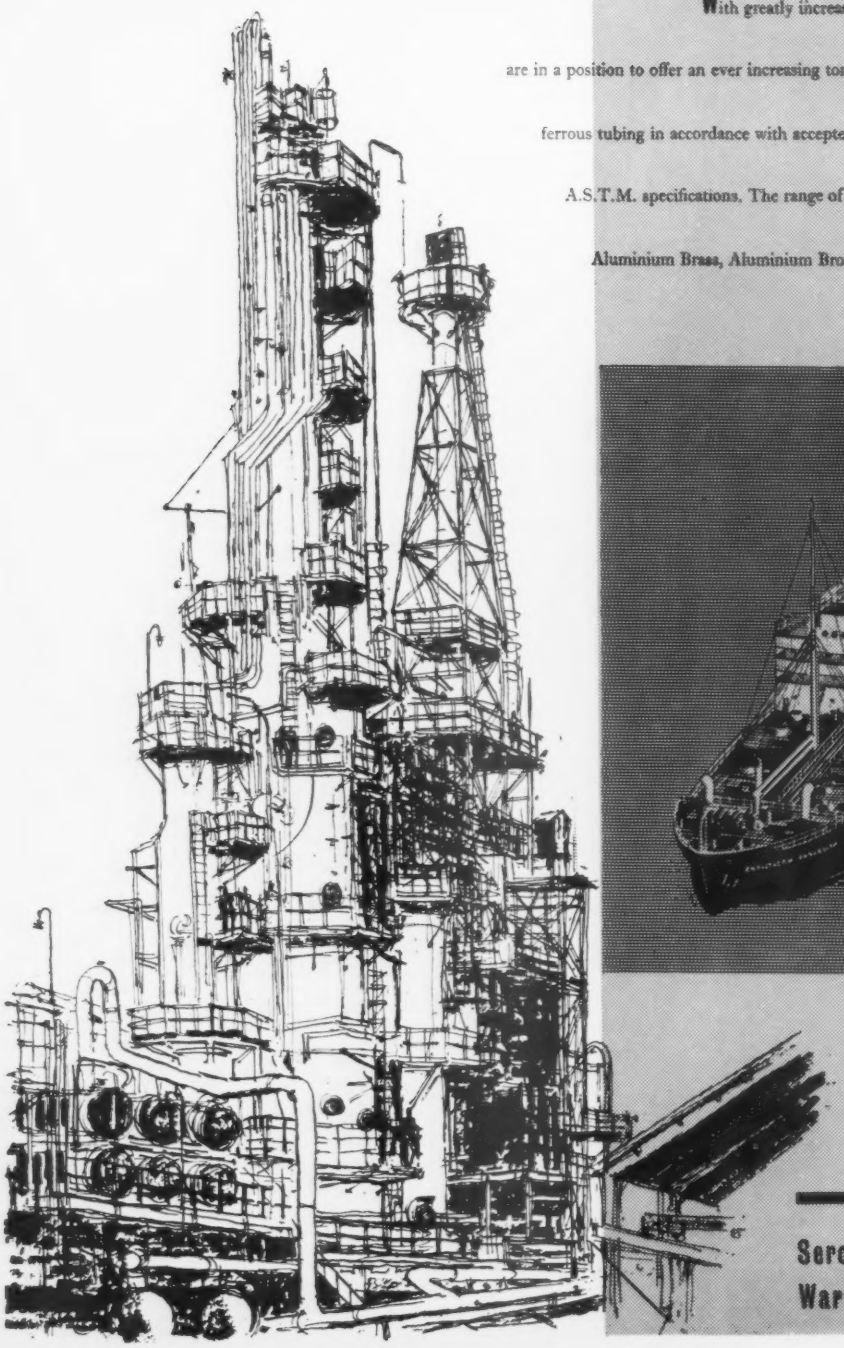
Published by The Institute of Petroleum
26 Portland Place, London, W.1

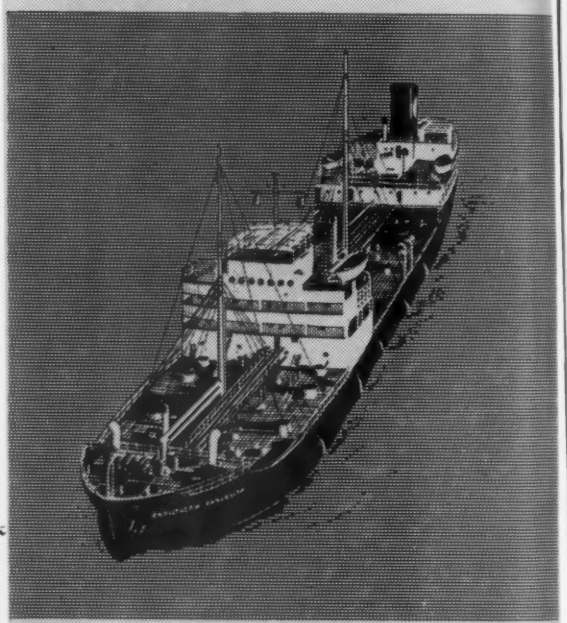
SERCK

NON-FERROUS TUBES

for the Petroleum Industry

With greatly increased production facilities Serck are in a position to offer an ever increasing tonnage of High Grade Non-ferrous tubing in accordance with accepted British Standard and A.S.T.M. specifications. The range of tubes includes Admiralty Brass, Aluminium Brass, Aluminium Bronze and Cupro-Nickel.





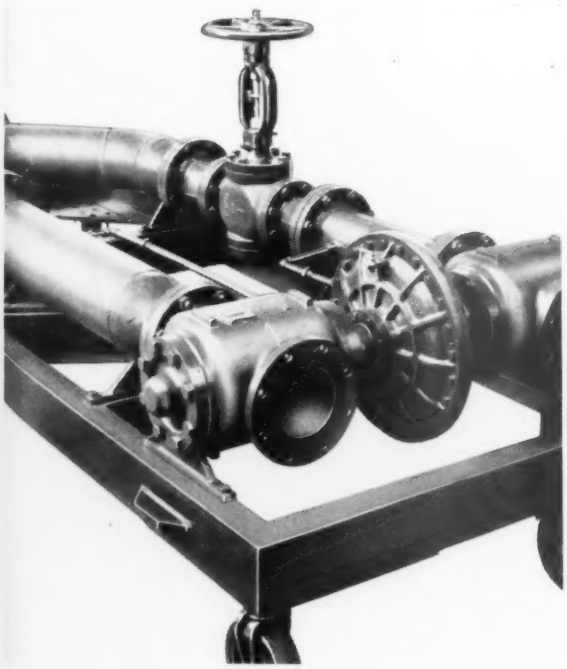
Serck Tubes Limited
Warwick Road · Birmingham 11

FISHER

Blending Unit

FOR IN-LINE BLENDING

OF INTERMEDIATE GRADES OF FUEL OIL



Robustly constructed in steel, this unit can be built into a pipeline system or mounted on a trailer and connected by hose. Suitable for the following typical operations:

- IN-LINE BLENDING DIRECT TO SHIP'S BUNKERS
- IN-LINE BLENDING DIRECT TO BULK LIGHTERS OR SMALL CRAFT
- IN-LINE BLENDING DIRECT TO ROAD OR RAIL VEHICLES
- IN-LINE BLENDING DIRECT TO A TANK THROUGH THE NORMAL CONNECTIONS AND WITHOUT RE-CIRCULATION

Write for full particulars to.

FISHER GOVERNOR COMPANY LIMITED

Airport Works, Rochester, Kent (Chatham 3404)

THE INSTITUTE OF PETROLEUM

REVIEW

Published monthly by

THE INSTITUTE OF PETROLEUM

26 Portland Place, London, W.1

'Phone: LANgham 2250

Vol. 11, No. 124 **April 1957**

Contents

THE ANNUAL DINNER 85

THE PRODUCTION OF TOWN GAS BY THE CATALYTIC GASIFICATION OF PETROLEUM OILS
By J. B. McKean 90

KUWAIT SYMPOSIUM ON RESERVOIR DATA 98

AROUND THE BRANCHES 102

THE EASTLAKE MEDAL 104

PERSONAL NOTES 105

PETROLEUM IN PARLIAMENT 106

NOTES OF THE MONTH 107

THE STORY OF KUWAIT 111

BAHRAIN BRANCH FIRST ANNUAL DINNER 112

BOOKS 113

LIQUID FLOW MEASUREMENT 114

TRADE LITERATURE, ETC. 116

FORTHCOMING MEETINGS 118

Price 1/6 Annual Subscription 15/-, post free

The Institute of Petroleum as a body is not responsible either for the statements made or for the opinions expressed in the following pages.

Printed by
Richmond Hill Printing Works Ltd., Bournemouth

EXCITING PROMISE OF DRY POWDER FULFILLED BY NU-SWIFT!

HOW NU-SWIFT DRY POWDER KILLS DANGEROUS FIRES

Released from a sealed pressure charge, the finely ground powder bursts out in a fan-shaped cloud, smothering and blanketing the fire. The fine cloud also gives the fire fighter complete protection against the intense heat of a liquid fire, allowing him *to get within effective range of the blaze.*

DRAWBACKS HITHERTO ASSOCIATED WITH DRY POWDER PRINCIPLE NOW ELIMINATED

WE MAKE OUR OWN POWDER It is carefully prepared, ground, sieved, and mixed in our own £30,000 powder mill. Special treatment during manufacturing process avoids any chance of coagulation through static electricity.

No ingredients liable to bacteriological decay are used in its manufacture.

EFFICIENT EXTINGUISHER DESIGN Nu-Swift dry powder is held in sealed pressure charges—so it cannot cake, pack, or coagulate because of humidity.

Only negligible maintenance is necessary: inspection is simple—the tell-tale gauge on the container indicates whether the charge is unused and under pressure.

NU-SWIFT DRY POWDER IS NON-TOXIC; NON-CONDUCTIVE; NON-CORROSIVE; NON-ABRASIVE; AND FROST-PROOF DOWN TO —40°C.

EXTINGUISHER MODEL 1604: £10.10.0.
FOC Ref. No. 104/8. Spare charges (No. 64) 95/-

SEND OR PHONE FOR BOOKLET No. 364 — better still, mail your order—and see for yourself!

NU-SWIFT

THE WORLD'S FASTEST AND MOST RELIABLE FIRE FIGHTING EQUIPMENT

NU-SWIFT LTD., 25 PICCADILLY, LONDON, W.1. Tel: REGent 5724
FACTORY & HEAD OFFICE: ELLAND, YORKSHIRE. Tel: Elland 2852

To Nu-Swift Ltd., Dept. IP, 25 Piccadilly, London, W.1.
Please let me have your Dry Powder Extinguisher booklet No. 364.

NAME.....

ADDRESS.....

.....

THE NU-SWIFT DRY POWDER EXTINGUISHER MODEL 1604

Astounding new Dry Powder extinguisher which kills these fires IN SECONDS:

CLASS 'B' FIRES

*All accessible inflammable liquid fires, including alcohol, petrol, organic solvents of every kind, oils and asphalts.

CLASS 'C' FIRES

*All electrical fires, and fires in motor vehicles, electronic equipment, etc.

Atmospheric and Vacuum Distillation Units

Combined Distillation, Cracking, Reforming and Vapour Phase Treating Units

Pressure Distillate Re-run Units

Gasoline Recovery and Stabilization Units

Fractionating Columns and Tube Stills

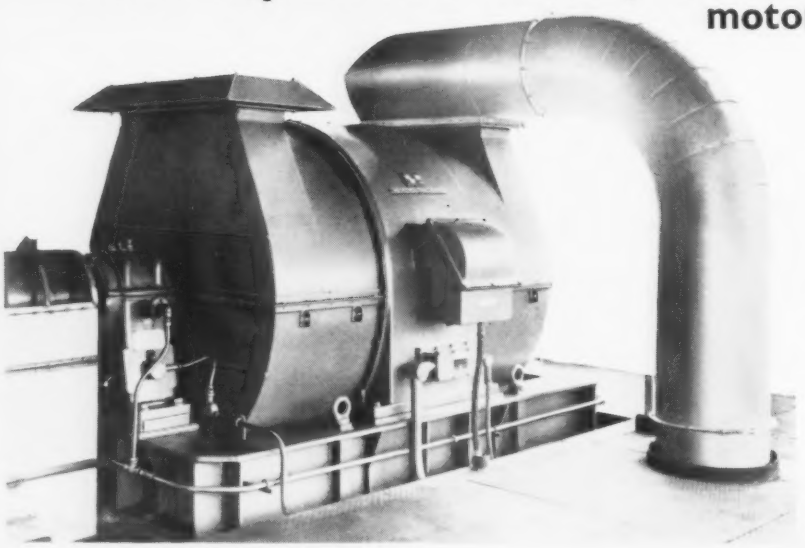
Wax Refining, Sweating and Moulding

A. F. CRAIG & COMPANY LIMITED

CALEDONIA ENGINEERING WORKS • **PAISLEY** • **SCOTLAND**

LONDON OFFICE: 727 SALISBURY HOUSE · LONDON WALL · E.C.2 · PHONE **NAT**IONAL **3964**

3000 hp—3000 volts, Direct-on-line started motors at Fawley



Metrovick motors are in use in oil refineries throughout the world; complete ranges of such motors have been designed by Metrovick Engineers to meet the specialized requirements of the oil industry. These motors embody the experience gained over many years and incorporate features which are essential to the oil industry.

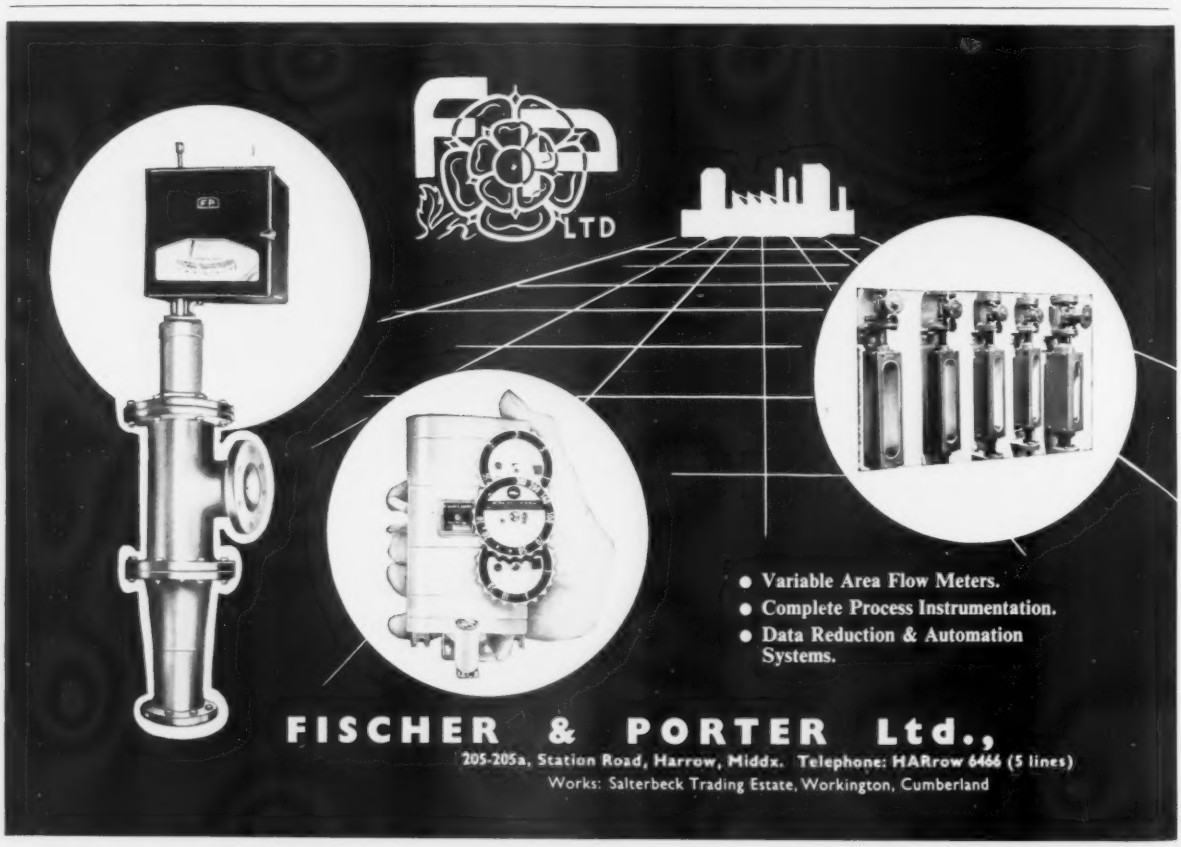
This 3000 hp, 1,480 r.p.m., 3kV motor is the largest direct-on power-line started machine to be installed in a British oil refinery; it is a Type AMS, pipe-ventilated, squirrel-cage induction motor and drives the main air compressor on the Hydroformer unit at the Esso Oil Refinery, Fawley. A similar rated machine, but force-ventilated because of the hazard, drives a hydrogen compressor on the same unit.

Motors for the Oil Industry

METROPOLITAN-VICKERS
ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER 17

An A.E.I. Company

J O—602

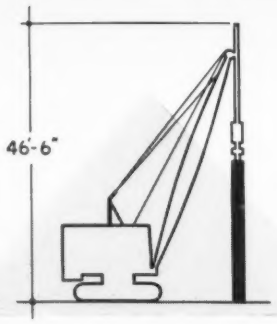


FISCHER & PORTER Ltd.,

205-205a, Station Road, Harrow, Middx. Telephone: HARrow 6466 (5 lines)

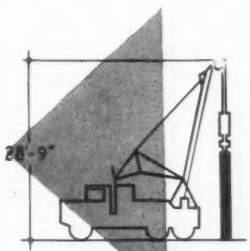
Works: Salterbeck Trading Estate, Workington, Cumberland

Adaptability

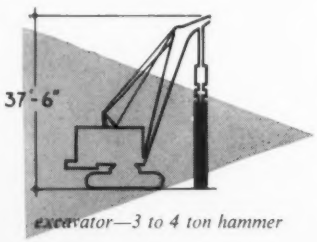


excavator—4 to 5 ton hammer

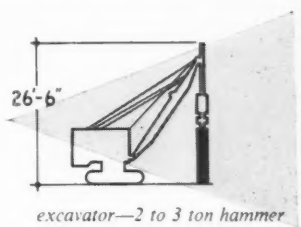
WEST's Reinforced Concrete Tubular Shell Piles have been used for supporting all types of structures including steelworks, factories, gas and electricity installations, bridges, flats and houses. The system is a successful combination of the pre-cast and cast-in-situ methods of piling. A pre-cast reinforced concrete sectional outer shell is driven to a "set" in the load-bearing stratum and a reinforced concrete core is cast inside this shell after driving is completed. The consolidating effect of the positively driven pile is therefore retained but there is no fatigue in the pile core. Varying strata depths present no difficulty as extension of the outer shell during driving is a basic feature. Shell diameters are 14½ in., 17½ in. and 20 in. for loads up to 40, 60 and 100 tons per pile respectively, depending on length of pile and type of strata. The specialised piling outfits used can operate under a wide range of site conditions. Normally self-propelled tracked machines fully slewing through 360°, they can travel off a low-loader transport at site under their own power, function as a crane for erecting the piling equipment and, given reasonable facilities, may be pile-driving within twenty-four hours of arrival. The same machine can drive piles from 10 ft to 80 ft or even 100 ft long, thus taking full advantage of the increment shell system when piles with varying penetrations are required.



lorry—2 to 3 ton hammer



excavator—3 to 4 ton hammer



excavator—2 to 3 ton hammer

Please write for our latest publications

WEST'S SHELL PILING

SYSTEM

WEST'S PILING & CONSTRUCTION COMPANY LIMITED

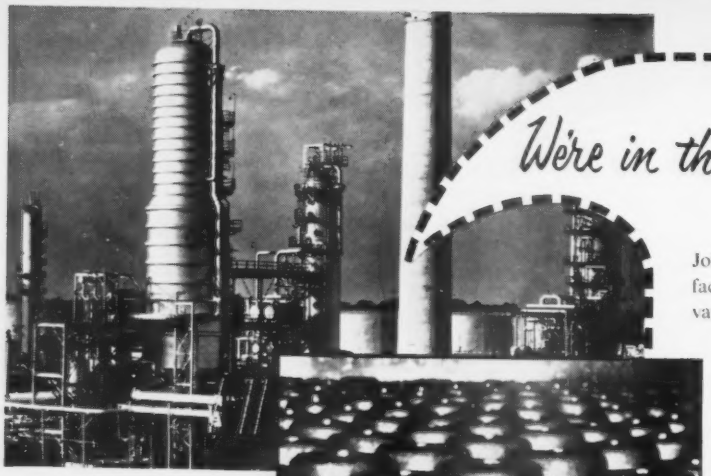
FOUNDATION SPECIALISTS . DESIGN AND CONSTRUCTION IN REINFORCED CONCRETE

BATH ROAD, HARMONDSWORTH, MIDDLESEX. TEL: WEST DRAYTON 2288

London: Columbia House, Aldwych, W.C.2 *North*: Albion Ironworks, Manchester 10
Midlands: 83 Edmund St, Birmingham 3 *Scotland*: 169 Hamilton Rd, Glasgow E.2

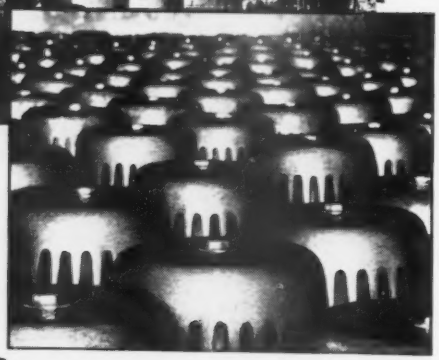
Paris (Seine): Compagnie Générale de Construction de Fours

G3



Photographs by courtesy of the Esso Petroleum Co. Ltd.

We are now also licensed by the Socony Mobil Oil Company of U.S.A. to manufacture the Uniflux tray to their designs.



We're in the Petroleum business too!

Johnson's have great experience in manufacturing bubble decks and ripple trays of various types. The bubble decks illustrated are made in easily assembled sections to fit in with any layout of processing plant. The speed of assembly and maintenance, plus many other advantages, results in real economy. Fabricated from stainless steel, carbon steel or alloy steels, these modern trays increase efficiency in any refinery.

Johnson's

A. JOHNSON & CO. (LONDON) LTD.

Works & Sales Office: **Dukes Road, Western Avenue, Acton, W.3.** *Telephone:* **Acorn 6061**
Telegrams: **Agenticum Telex London** *Head Office:* **Africa House, Kingsway, London, W.C.2.**

HANDY VOLUMES
OF THE
ASTM/IP PETROLEUM MEASUREMENT TABLES
British and Metric Editions

	s.	d.
Vol. A. Interrelation of Units, Gravities and Density and Volumes	2	0
Vol. B. Weights per Unit Volume and Volumes per Unit Weight against Sp. Gr. 60/60 F....	3	6
Vol. C. Reduction of Observed Specific Gravity and Volume to 60 F. For LPG and Casinghead Gasoline	5	0
Vol. D. For Aviation Gasoline, Motor Gasoline, Kerosine and Gas Oil	6	0
Vol. E. For Diesel Fuel and Fuel Oils ...	6	6
Vol. F. For Fuel Oils and Bitumen ...	6	6

	s.	d.
Vol. G. Reduction of Volume 60 F. against Specific Gravity 60/60 F.	5	0
Vol. H. Miscellaneous Metric Tables ...	3	6
Vol. I. Reduction of Observed Density and Volume to 15 C. For LPG and Casinghead Gasoline	6	0
Vol. J. For Aviation Gasoline, Motor Gasoline, Kerosine and Gas Oil	6	6
Vol. K. For Diesel Fuel and Fuel Oils ...	7	6
Vol. L. For Fuel Oils and Bitumen	7	6

British Tables A—G; Metric Tables H—L

Obtainable from:—

INSTITUTE OF PETROLEUM
26, Portland Place, London, W.1.

BP FUELS NORWAY'S FISHING FLEETS

THESE NORWEGIAN fishing boats are often out in the fishing grounds for weeks on end, covering many hundreds of miles during their stay at sea. On their return to their home fiords, the catch is landed, nets are repaired, and at places all along Norway's coasts BP oil fuel is pumped into the boats' fuel tanks.

The BP Shield is a familiar sight from the Arctic to the Antarctic. At sea, on land and in the air, BP makes an ever-growing contribution to the work and well-being of mankind.

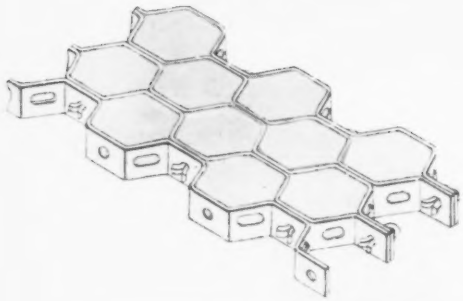
The BP Shield is the symbol of the world-wide organisation of

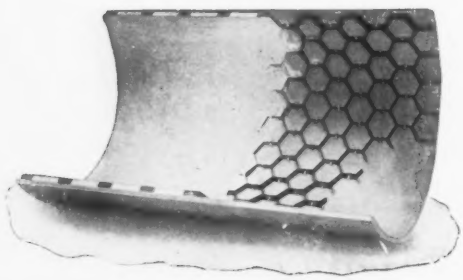
The British Petroleum Company Limited

BRITANNIC HOUSE · FINSBURY CIRCUS · LONDON, E.C.2.

CORROSION in Oil Refineries.

in Five Continents





HEXMETAL

is preventing fracture, and is minimising scour and erosion of protective linings

- CAT CRACKERS
- HYDROFINERS
- REACTORS
- COLUMNS
- PIPE LININGS
- CHAMBERS
- FLUES
- ETC.

Hexmetal may be supplied in mild, firebox type, or coated steel and in chromium alloys. When loaded with refractories or cements it is proof against the most severe conditions.

The patented pinned cells of Hexmetal provide strength to resist blistering and collapse of linings.

Complete fabrication of tailored and bound sections is undertaken to suit all shapes of pipes and vessels and the two-way flexible construction of Hexmetal is available for domed roofs.

Our staff will readily advise on any lining problem.

Write for literature and/or sample to:-

CAUSEWAY REINFORCEMENT LTD.

66, Victoria Street, London, S.W.1. Telephone: Victoria 8648

HYDRONYL

THE PIONEERS OF CONTACT RINGS

founded 1914

TOWER PACKINGS

of all types and materials

HY CONTACT

LESSING RINGS

RASCHIG RINGS

BERL SADDLES

CATALYST SUPPORT BALLS

HY-MESH RINGS

"SPRAYPAK"

Under licence of U.K. Atomic Energy Authority

THE HYDRONYL SYNDICATE LTD.

14, Gloucester Road, London, S.W.7.

telephone: KNIghtsbridge 6803

telegrams: Hydronyl, Kens. London

Advertisers

	PAGE
Anchor Chemical Co Ltd	Mar.
Audley Engineering Co Ltd	Feb.
E. B. Badger & Sons Ltd	*Inside Back Cover*
British Petroleum Co Ltd, The	vii
British Thomson-Houston Co Ltd, The	Feb.
Causeway Reinforcement Ltd	viii
A. F. Craig & Co Ltd	iii
Dewrance & Co Ltd	Mar.
Dorr-Oliver Co Ltd	Jan.
Electrothermal Engineering Ltd	xviii
Elliott Bros. (London) Ltd	i
English Electric Co Ltd, The	xvi
Esso Petroleum Co Ltd	—
Evertaut Ltd	Mar.
Fischer & Porter Ltd	iv
Fisher Governor Co Ltd	Feb.
Fothergill & Harvey Ltd (Tyglas)	Mar.
W. J. Fraser & Co Ltd	xii
A. Gallenkamp & Co Ltd	Mar.
Geophysical Prospecting Co Ltd	Mar.
Matthew Hall & Co Ltd	xiii
John Harper & Co Ltd	Mar.
W. C. Holmes & Co Ltd	Mar.
Honeywell-Brown Ltd	xiv
Hydronyl Syndicate Ltd	viii
International Paints Ltd	Mar.
A. Johnson & Co (London) Ltd	vi
Kellogg International Corporation	xxi
Kelvin & Hughes (Industrial) Ltd	—
Lake & Elliot Ltd	Mar.
J. Langham Thompson Ltd	Jan.
London & Thames Haven Oil Wharves Ltd	x
M & C Switchgear Ltd	Mar.
A. & J. Main & Co Ltd	Mar.
Metal Containers Ltd	*Back Cover*
Metal Propellers Ltd	Mar.
Metropolitan-Vickers Electrical Co Ltd	iv
Moon Brothers Ltd	xi
Motherwell Bridge Contracting & Trading Co Ltd	Mar.
Nu-Swift Ltd	ii
Ralph M. Parsons Company	Jan.
Peirson & Co Ltd	Mar.
F. Perkins Ltd	xv
Petroleum Inventions Ltd	Mar.
Petrolite Corporation	Mar.
W. Press & Son Ltd	xvii
Pyrene Co Ltd	Mar.
John Rabone & Sons Ltd	Dec.
Serck Radiators Ltd	*Inside Front Cover*
Shell-Mex & B.P. Ltd	ix
Shell Chemical Co Ltd	xx
Simmons & Hawker Ltd	Mar.
Peter Spence & Sons Ltd	Feb.
Stewarts and Lloyds Ltd	xxii
Stothert & Pitt Ltd	Mar.
Taylor-Short & Mason Ltd	Jan.
Trent Valve Co Ltd	—
United Steel Companies Ltd, The	xix
C. C. Wakefield & Co Ltd	Mar.
West's Piling & Construction Co Ltd	v

Shell-Mex and B.P. Ltd.
are the distributors in
England, Wales and Northern Ireland
for the Shell, BP, and Eagle Groups;
Scottish Oils and Shell-Mex Ltd.
in Scotland; Irish Shell Ltd.
in the Republic of Ireland.
Behind all three companies
lie the vast and world-wide resources
of the Shell, BP, and Eagle Groups.

LONDON'S GREAT OIL RESERVOIR

at THAMES HAVEN

This expanding independent oil storage installation at Thames Haven — not only the largest but the oldest established in the country — serves London and the Home Counties as its principal duty.

The oil companies utilise the immense and comprehensive storage facilities at Thames Haven - more than a million tons capacity — and it is from there that they feed their depots which in turn distribute their world famous brands to the thickly populated area of Greater London.

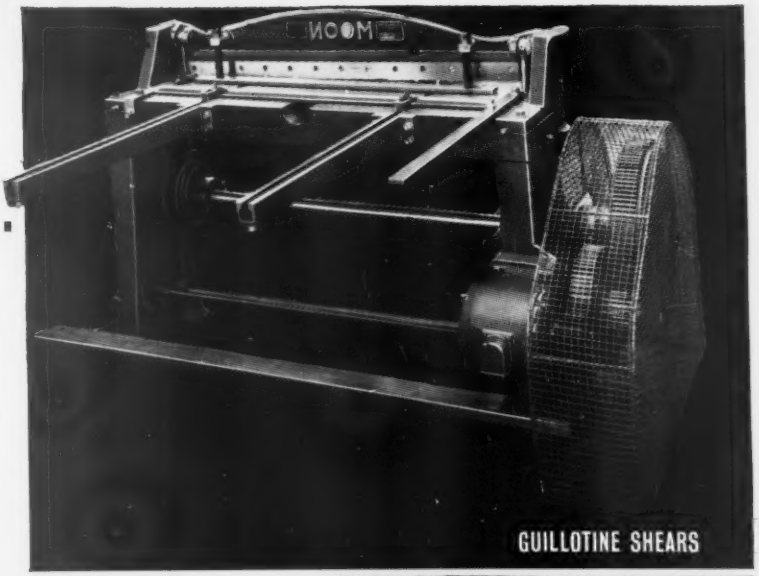
LONDON AND THAMES HAVEN OIL WHARVES LIMITED

3 St. HELENS PLACE LONDON E.C.3 *Tel: AVEnue 6444* THAMES HAVEN INSTALLATION *Tel: Stanford-Le-Hope 2232*

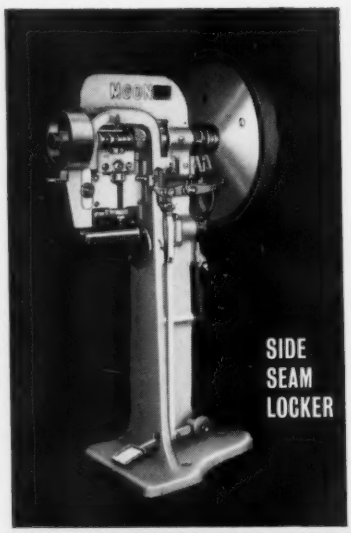
From Guillotine to Trimmer and Beader...

we make the whole range of machines for the manufacture of round and irregular tins of all sizes; for example, ham tins, paint tins, biscuit tins, oil tins, etc.

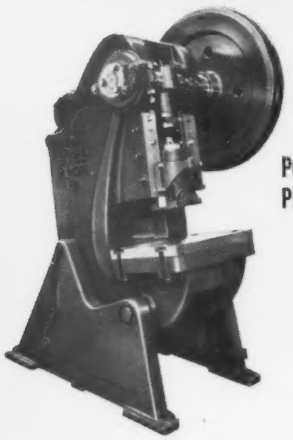
For many years we have supplied complete plants, comprising hand operated, semi-automatic and fully-automatic machinery for all sizes of tin boxes, steel drums and screw caps



GUILLOTINE SHEARS

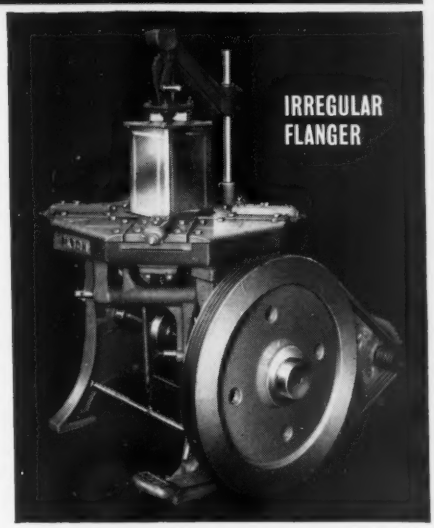


SIDE SEAM LOCKER

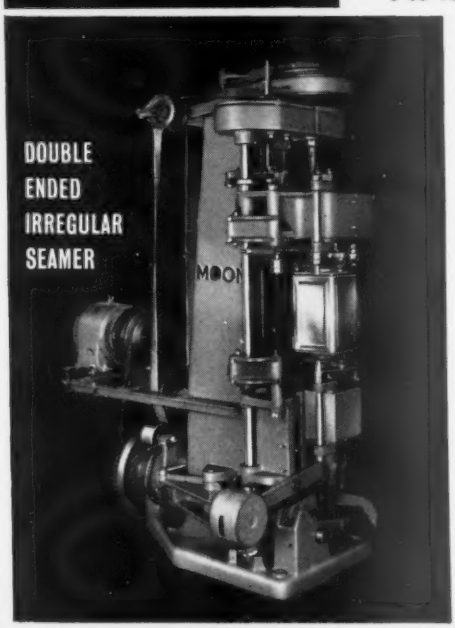


POWER PRESSES

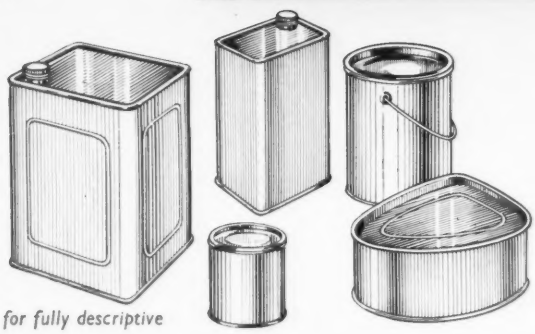
6-60 TONS CAPACITY



IRREGULAR FLANGER



DOUBLE ENDED IRREGULAR SEAMER



Write for fully descriptive literature to:—

MOON

MOON BROTHERS LIMITED, BEAUFORT ROAD, BIRKENHEAD.
TELEPHONE: BIRKENHEAD 1527/8/9. CABLES: "MOONBRO" BIRKENHEAD

LONDON OFFICE
ABBEY HOUSE, 2/8 VICTORIA ST., WESTMINSTER, S.W.1. TEL: ABBEY 1905

SPECIAL-PURPOSE REFINERY UNITS
The world-wide Fraser Contracting Organisation offers a complete service for the design and construction of special purpose petroleum refinery plant. Recent examples include the Solvents Distillation Unit at ESSO Ocean terminal Purfleet, Essex (illustrated), the Autofining Plants at Llandarcy and Aden and The Platformate Splitter Units at Llandarcy and Isle of Grain, for the British Petroleum Co. Ltd.
DEVELOPMENT • DESIGN • ENGINEERING • FABRICATION • PURCHASING
EXPEDITING • INSPECTION • ERECTION • COMMISSIONING
COMPLETE ENGINEERING BY
W.J. FRASER & CO. LTD.
Romford, Essex & Barnsley, Yorks.
Australia · New Zealand · Rhodesia · S. Africa · Spain

THE INSTITUTE OF PETROLEUM
REVIEW

Volume 11, No. 124 April 1957

Honorary Editor: E. B. EVANS, M.Sc., PH.D., F.R.I.C. *Hon. Associate Editor:* D. L. SAMUEL, B.Sc., A.R.I.C. *Editor:* GEORGE SELL

The Annual Dinner

A NEW RECORD OF ATTENDANCE

With an attendance slightly in excess of one thousand three hundred members and guests, the 1957 Annual Dinner of the Institute established a new record and filled to capacity the Great Hall at Grosvenor House on 20 February. The chair was taken by The Rt Hon Lord Geddes, president, and the guests of honour were Sir John Maud, G.C.B., C.B.E., Permanent Secretary to the Ministry of Power, and General Sir Neville Brownjohn, K.C.B., C.M.G., O.B.E., M.C., Quartermaster General to the Forces.

Among the official guests were: Sir Donald Anderson; R. J. Ayres, C.B., C.B.E., Deputy Secretary, Ministry of Power; H. Beeley, C.M.G., C.B.E., Under Secretary, Foreign Office; L. B. Berry, O.B.E., director, Lobitos Oilfields Ltd; L. M. Broadway, chairman, C. C. Wakefield & Co Ltd; T. A. Crowe, president, Institution of Mechanical Engineers; Admiral of the Fleet Sir John Cunningham, G.C.B., M.V.O., chairman, Iraq Petroleum Co Ltd; W. E. Eadie, managing director, The Burmah Oil Co Ltd; N. A. Gass, C.B.E., M.C., chairman, The British Petroleum Co Ltd; Sir Stephen Gibson, C.B.E., managing director, Iraq Petroleum Co Ltd; Professor R. M. Gordon, president, Royal Society of Tropical Medicine and Hygiene; J. C. Gridley, C.B.E., chairman, Mobil Oil Co Ltd; Air Chief Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C., Air Member for Supply and Organization; Professor L. Hawkes, president, The Geological Society; R. Henderson, Director of Stores, Admiralty; J. B Kay, oil geologist, Ministry of Power; E G. C. Mardall, managing director, Trinoil (U.K.) Ltd; Vice-Admiral Sir Frank T. Mason, K.C.B., Engineer-in-Chief to the Fleet; J. A. Oriel, C.B.E., M.C., president, Institute of Chemical Engineers; J. M. Pattinson, C.B.E., managing director, The British Petroleum Co Ltd; B. F. Pool, C.B.E., Director of Naval Contracts; H. W. Rocke, president, Oil Industries Club; A. M. D. Ross, C.M.G., Assistant Under Secretary of State, The Foreign Office; J. R. Rylands, president, Institute of Fuel; René Sergent, Secretary General, OEEC; G. V. Sims, chairman, Council of British Manufacturers of Petroleum Equipment; Sir Leonard Sinclair, chairman, Esso Petroleum Co Ltd; C. A. P. Southwell, C.B.E., M.C., managing director, Kuwait Oil Co Ltd; F. J. Stephens, a managing director, The Shell Petroleum Co Ltd; K. L. Stock, Under Secretary, Ministry of Power; J. S. Swihart, Petroleum Attaché, The United States Embassy, London; H. C. Tett, a managing director, Esso Petroleum Co Ltd; R. E. F. de Trafford, O.B.E, chairman, Manchester Oil Refinery (Holdings) Ltd; C. M. Vignoles, O.B.E., managing director, Shell-Mex and BP Ltd; Simon J. Vos; R. N. Wakelin; Sir Owen Wansbrough-Jones, K.B.E., C.B., Chief Scientist, Ministry of Supply; F. Zuiderveld, managing director, Metal Containers Ltd.

Lord Geddes, President, with T. Dewhurst, a past-president.

The Members of the Institute Council present were Lt.-Col. S. J. M. Auld, O.B.E., M.C., T. Dewhurst, E. A. Evans (*past presidents*); E. B. Evans, A. C. Hartley, C.B.E., E. LeQ. Herbert, Professor F. Morton, R. B. Southall, C.B.E. E. J. Sturgess C.B.E. (*vice-presidents*); W. S. Ault, V. Biske, F. L. Garton, A. J.

Goodfellow, M. E. Hubbard, H. Hyams, E. C. Masterson, T. W. Mathias, O.B.E., J. S. Parker, A. J. Ruthven-Murray, C.M.G., D.L. Samuel, G. S. Smith, W. H. Thomas, O. F. Thompson, O.B.E., G. H. Thornley, C. G. Williams, C. S. Windebank (*members of Council*); and C. Chilvers (*hon. secretary*).

THE INDUSTRY AND THE INSTITUTE

The health of the petroleum industry and the Institute of Petroleum was proposed by Sir John Maud, G.C.B., C.B.E., Permanent Secretary to the Ministry of Power.

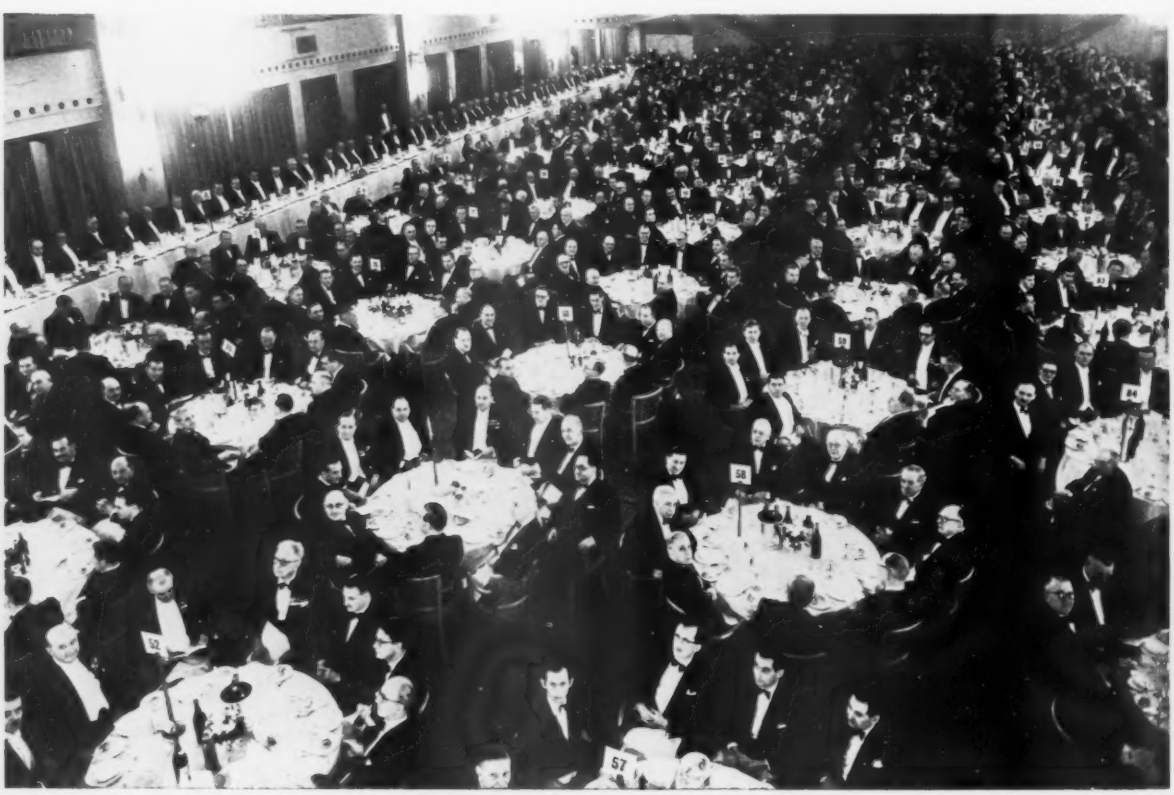
Remarking that this was the first occasion since the disappearance of the old Ministry of Fuel and Power that an official of the new Ministry had had the opportunity of paying tribute to the oil industry, Sir John recited a poem of his own composition as "A Belated Valentine from The Ministry of Power":—

> What say we to the industry? A simple story:
> Ours be the power (in name) and yours the glory.
> Let no Railroad Commission stop me if I say
> To hell with all "allowables" today.
> Unrationed, un-pro-rationed are my thanks
> To oilmen—British, Gallic, Dutch, or Yanks:
> Thank you, competing oleaginous oligarchs
> Who yet collaborate tho' Congress barks.
> Oil's collaboration, here's your health:
> Atlantic, European, Commonwealth!
> In brief—Petroleum Institute, whose head is
> Our friend and host, the noble Lord, Lord Geddes.

Europe, Sir John said, and the oil industry had been heavily tested these last six months. The testing time was not over. But the moment had arrived to pay tribute to the heroic efforts made by all branches of the oil industry on both sides of the Atlantic and to the wonderful co-operation they were giving the governments of the countries affected. Without these efforts far more serious damage would have been done to the economy of Western Europe and of Britain by the closing of the Suez Canal and the blocking of the Syrian pipelines.

The representatives of 17 countries had been meeting regularly in Paris. They were succeeding not only in pooling their knowledge but in balancing national interests that often conflicted and devising an acceptable plan for sharing out gravely restricted quantities of oil. "Many people to-day feel profoundly dissatisfied with the United Nations machinery for international co-operation. Let us take heart from our experience of European co-operation over oil."

But, he continued, this striking achievement of co-operation between sovereign States would not have been effective without a corresponding achievement by the oil industry, the achievement of first working out their plans together and then enabling decisions taken by governments to be carried out. It was essential to have a link between European Governments and the international oil industry. That link had been forged by Mr Berkin and his Petroleum Emergency Group in Paris, working closely with Mr Coleman and his Committee of 15 United States companies in New York. That was what was making it possible for Europe to work



with one common purpose in face of a common threat. The success of this partnership between governments and industry had put the peoples of Europe deeply in debt to Mr Berkin, Mr Coleman, and their colleagues.

And all the time, supporting these leaders of European Governments and the oil industry, unnumbered workers had been labouring day and night behind the scenes, seeking out fresh sources of supply, reshaping the complex pattern of oil movement, and executing the decisions of government. In Britain it had been the servants of the oil companies who had done most of the work involved in deliberately restricting oil supplies to industry, a job that had never been done before, even in war. This must have gone against the grain for them but thanks to their superb exertions, employment and production had been maintained in a remarkable degree. Industry had had to put up with savage cuts in their supplies of gas oil and diesel oils; central heating had had to function on two-thirds of its requirements; fuel oil had been cut by a tenth—and yet the astonishing fact was that hardly a complaint had been heard. This was a tremendous tribute to Mr Vignoles and to all the oil distributing companies represented on his Emergency Committee in the U.K.

"It is faith," said Sir John, "that has triumphed—faith justified by real hard work. Governments have had faith in one another and in the oil industry. Oil companies have had faith in one another and in governments. So let us go forward with faith in the future. Let us rejoice in the promise of atomic energy. Let us be encouraged by the fact that our coal industry is producing more coal this year than in any corresponding period since before the war. Britain and the rest of Europe will need, as far ahead as we can see, not only all the coal and nuclear power that we can get but all the oil that you can find for us."

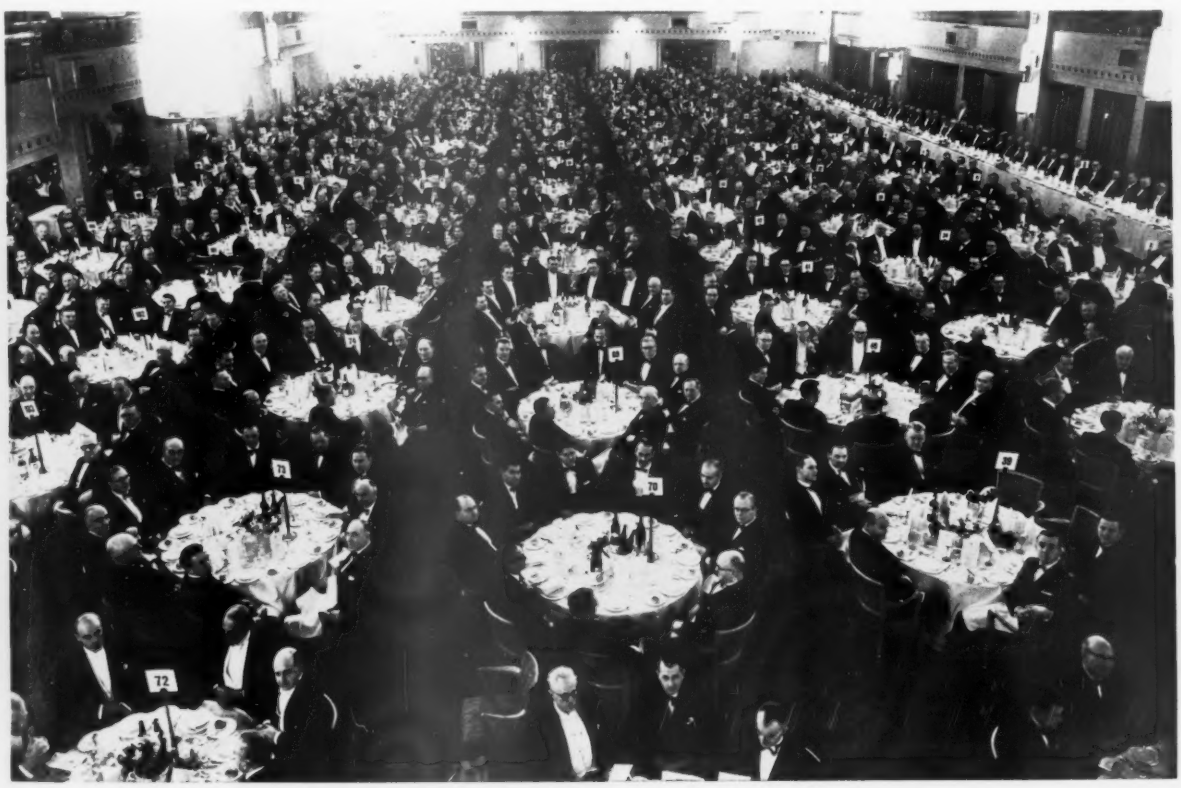
The President Replies

Replying to the toast, Lord Geddes first referred to some of the activities of the Institute during 1956, including preparations for the move into its new premises and to the success of its various publications. He also mentioned that the IP Codes of Safe Practice were to include one for the tanker industry and that the 1956 Summer Meeting, with its theme of the future development of the industry, was an outstanding example of how the Institute served not only the industry but the country.

This, said Lord Geddes, brought him to his main point which could be briefly expressed as—Whither goes the oil industry? He continued:

"The chain of events which started with Colonel Nasser's so-called nationalization of the Suez Canal last July (and do not forget that 43 per cent of the Canal Company belongs to the British Government), a chain which led through the admirable but unavailing efforts of the Menzies Mission, to the far-sighted Anglo-French move in October to protect the Canal, to the tragedy of our withdrawal, and to the present obscurity, have brought to public view the vital functions of the industry which in more normal times are so easily taken for granted.

"Before that unhappy chain of events, it had already



Sir Leonard Sinclair, chairman of Esso Petroleum Co. Ltd, H. C. Tett, a managing director of Esso Petroleum Co. Ltd, and Lt.-Col. S. J. M. Auld, O.B.E., M.C., a past-president of IP.

become clear that the demand for energy in Western Europe was rising so fast, and seemed likely to continue to do so, that the strength of the industry would be stretched to its limit to meet it. After allowing for the most optimistic forecasts of other forms of energy, it was evident that within the next ten years the quantity of petroleum required by western civilization would be almost double the present figure, and might well double itself again in the subsequent decade.

"Now we are faced with grave doubts about the future of the Suez Canal. Already signs are showing that if it is left under Egyptian control, it is not only unlikely to be run and developed as it would have been in the hands of its legal owners, but much worse, that its users may have to comply with any demand, however irrational, imposed by a government which has already shown itself to be irrational. Apart from such political control there have been such monstrous

Vice-Admiral Sir Frank T. Mason, K.C.B., and the President.

suggestions as that the cost of unblocking the Canal should be covered in the future levy of dues on shipping, and that means paid for largely by the petroleum industry.

Sanctity of Contracts Essential

"What are the alternatives? We must, repeat must, recapture the sanctity of contracts in the Middle East. It might be that clear, strong, moral pressure from the United Nations could achieve this end and bring the Egyptian Government to reason: but how realistic is this hope? For nearly seven years Israeli ships have been forbidden transit through the Suez Canal, and, gentlemen, I believe that that hope exists only in cloud-cuckoo-land. The second alternative is that the freedom of transit should be guaranteed by an international force and that is, of course, what the British and French Governments saw to be the answer when they landed last October. This solution must, in the nature of things, depend on an enlightenment in Washington, the dawning of which has been such a heartening feature of the past few weeks. In that dawning and especially in the good news to-day of the increased Texas "allowables",

Air Chief Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C., with A. C. Hartley, C.B.E., a vice-president.

one sees too, a realization that the United States' own self-interest is ultimately at stake as much at Suez as it would be at Panama, but the fundamental problem has arisen from the fact that this is not enough. To resolve the problem which, through the oil industry, is facing western civilization, it is essential that there should be a new thinking in the United States. With all respect to my and our many friends across the Atlantic, I believe that their attitude should be, '*We are the greatest power in a system of alliances which we have caused other nations to enter with us. Free and unhindered navigation of the Suez Canal is at all times vital for the countries which, at our call, have become our allies. That freedom of navigation is threatened and that in turn imposes on us a grave duty, and we are bound in honour to see to it that the threat to their lives is removed and that the unhampered passage of the Suez Canal is at all times assured.*'

"Until that has become the American approach, you, gentlemen, will continue to be faced with a responsibility of the greatest gravity in your efforts to keep the wheels of western civilization turning.

Simon J. Vos and E. G. C. Mardall.

"I have been dwelling on the American attitude and there is no doubt that the United States must be the prime mover in the search for the answer to Suez, but what of the countries east of the Canal, where one's mind turns particularly to India. Restricted or more costly freights from Europe to India will disastrously affect the economic plans which have been such a spectacular feature of the past decade. Moreover, apart from motives of self interest, one should be able to expect from India support for any plan directed towards the unhampered movement of peoples and goods throughout the world, but perhaps there too, sober second thoughts will prove wiser than what have seemed to be misguided impetuous actions in the recent past.

"Although we must all hope that the United States and our other friends will recognize their responsibility and will act, that can do little more than restore the position as it was last summer when the anticipated traffic was already a serious problem; so serious indeed was it that it already seemed likely that it would exceed the capacity both of the Canal and of the planned pipelines in the foreseeable future, and that for the future at least some of the oil would have to travel in big expensive ships around the Cape. I believe that whatever may be the solution at Suez, there remains a herculean task to produce the facilities in the forms of ships and pipelines to move the oil which is required, and there is even doubt whether it will be possible to provide sufficient facilities in the time available; but half a loaf is better than no bread, and the sooner the challenge which faces the oil industry is met, the more hope there will be that it will be able to stand the strain whatever may be the political future of the Suez Canal.

The Steel Position

"It is at this point that I would say a word about steel. It is a fact that if we had enough steel of the right kinds in Britain, our shipyards could build, with their existing facilities and without having to employ another man, almost half a million additional deadweight tons per annum. That is the equivalent of another twenty-five 18,000-ton tankers annually, or sufficient new ships each year to carry from the Persian Gulf via the Cape to the United Kingdom an additional two million tons of oil per year. Perhaps it is the fault of the consumers of steel that they failed adequately to warn the steel industry that its development was running so lamentably short of requirements, although that should hardly have been necessary; perhaps that shortage is partly attributable to the political uncertainties which faced the steel industry five years ago, but the fact is that without more steel of the right quality, in the right place and at the right time, it is hard to see how the task of the oil industry can be completed.

"You have been patient in listening to what I have said. There have, in the recent past, been sincere differences both domestically and internationally and there have been misunderstandings, and fault is never one-sided.

"The future is too complex and the consequences of failure too grave to permit of the luxury of such differences, and what is now vital is that there should be a proper grasp of the realities of the situation and a united effort to meet them."

The Guests

Lord Geddes said it was his pleasant task also to propose the toast of the guests, who included many leaders of the oil industry. He particularly welcomed Mr Gass and wished him every success in his new office of chairman of The British Petroleum Company. A special tribute should also be paid, he said, to M. René Sergent, Secretary-General of OEEC, and to Angus Beckett, chairman of the OEEC Oil Committee.

It was only possible to mention a few of the guests among such a large gathering but, said Lord Geddes, to them all he would say: Welcome from The Institute.

General Sir Neville Brownjohn replied on behalf of the guests, saying he was sure that they would all wish him to express their thanks for the warmth of the reception of the toast and for the excellent good cheer.

Referring to some of the problems facing the Service, General Brownjohn said that the petroleum industry had always been a staunch supporter of the Armed Forces and he was only sorry that they had not been "allowed to complete that little job for you the other day. I can assure you that it wasn't the fault or the wish of the admirals, or the air marshals, or the generals".

E. LeQ. Herbert, a vice-president of the Institute, and J. M. Pattinson, a managing director of the British Petroleum Co. Ltd.

The Production of Town Gas by the Catalytic Gasification of Petroleum Oils

By J. B. McKEAN

Mr McKean, a chemical engineer of the South Eastern Gas Board, read the following paper at a meeting of the IP South-Eastern Branch on 6 March 1956.

It is generally believed that the coal reserves of the United Kingdom are sufficient for the next two hundred years and, until the advent of the second world war, the quantities being won had been able not only to supply all national needs, but indeed to support a flourishing export trade. The failure since then to attain the pre-war levels of production has been marked, and in common with other consumers the gas industry has been severely affected by the limitation in supplies. There has too been a decline in the availability of good gas-making coals at a time when industry has been showing a steadily increasing demand for gas.

Against this background, the gas industry has been seeking to develop processes of complete gasification from coals more readily available than the orthodox gas-making coals and to investigate sources, other than coal, for the production of town gas. The pressing need to conserve coal and the disproportionate post-war rise in its price has stimulated research and development in this direction in recent years.

A natural alternative raw material for the manufacture of gas is petroleum oil, either the crude oil or its various fractions. Its use for this purpose is, however, by no means novel. At the beginning of the century the abundance of oil in the U.S.A. stimulated the development of processes for converting oil to gas, particularly in areas where the cost of coal was high. Such was the Pacific Coast Oil Gas Process, producing gas with a calorific value of about 500-600 B.t.u/cu.ft. by cracking oil with steam on refractory chequers, and which, later, in a more efficient modification, came to be known as the Jones Oil Gas Process. In all such thermal cracking processes there is a copious production of carbon black.

The use of a petroleum fraction, "gas oil", for enriching water gas to a calorific value nearer to that of coal gas was also first developed in the U.S.A. The former now proves in the U.K. an invaluable tool in meeting variations in demand, since it can be easily converted by a thermal cracking process to gas in plant which, therm for therm, is lower in first cost than plant for the carbonization of coal. Petroleum fractions other than gas oil may also be used for the enrichment of water gas and both the light and heavy ends from the petroleum refining operations have been used for this purpose to a limited extent.

The hydrocarbon gases derived from gas oil or other petroleum fractions by thermal cracking in the presence of water gas are high in calorific value—about 1500-1600 B.t.u/cu.ft. The extent to which they may be produced is limited by the proportion which may be used to enrich water gas to a calorific value suitable for mixing with gas made from coal by carbonization, from which the industry must produce the bulk of its gas for many years to come.

Petroleum hydrocarbons gasified in this fashion are thus linked with coke, a by-product of coal, and do not therefore provide in the widest sense the raw material for the production of town gas alternative to coal.

Conversion of Oil to Gas

The technical problem of producing gas from petroleum hydrocarbons is the conversion of a fuel with a comparatively high ratio of carbon to hydrogen to one of lower ratio. As may be seen from Table I, the heavier the oil the higher the carbon to hydrogen ratio; the lower the calorific value of the gas the lower is this ratio.

TABLE I
VARIATION IN CARBON: HYDROGEN RATIO FOR VARIOUS OILS AND GASES

	Carbon, % by wt	*Hydrogen, % by wt*	*C:H ratio by wt*
Bunker fuel oil	84·5	11·3	7·48
Heavy fuel oil (950 sec) ...	84·9	11·6	7·32
Gas oil	85·1	13·2	6·45
Kerosine	86·2	13·6	6·34
Petrol	85·4	14·6	5·85
Light distillate	83·5	16·5	5·04
Butane	82·8	17·2	4·80
High B.t.u gas (890 B.t.u cu.ft.)	61·7	14·1	4·38
Town gas (500 B.t.u/cu.ft.)	73·0	27·0	2·70

It is a characteristic of town gas that the ratio of carbon to hydrogen by weight is in the region of 2·7:1. The production of such a gas from any oil by a simple thermal cracking process is bound to result in carbon being thrown out of the oil molecule either as elementary carbon or as a tar of higher carbon:hydrogen ratio than the original oil. It is a simple exercise to show that in such a treatment of an oil of high carbon:hydrogen ratio, such as heavy oil, the efficiency of conversion to gas must indeed be low.

It is clear that some external source of hydrogen is required in order to maintain as much as possible of this excess of carbon as gas, and the cheapest and most readily available form is as steam. Normally, the reaction of steam with carbon is too slow to keep pace with the formation of carbon in a cracking process, but it is possible by the use of suitable catalysts to sufficiently accelerate this reaction so that the formation of carbon can be controlled.

It is well known from the work of Cobb and others that the alkalis and alkali earths are excellent catalysts when reacting carbon with steam, and this has led to the development of a lime

catalyst for the conversion of petroleum hydrocarbons to town gas and to the work which has culminated in what is now known as the Segas Oil Gasification Process.

TABLE II

GASIFICATION OF GAS OIL WITH STEAM OVER VARIOUS CATALYSTS

Temperature ... ... 900 *C*
Duration of experiment ... 2–3 *hr*
Steam:oil ratio (w/w) ... 3:1
Oil rate ... ... 8·4 *g/hr*

Catalyst	*Bauxite*	*Calcined bauxite*	*Alumina*	*Na_2CO_3 on calcined bauxite*	*CaO on silica*
Volume of gas made, S.T.P. cu.ft/hr ...	0·54	0·21	0·59	0·83	1·00
Calorific value, B.t.u/cu.ft. ...	430	922	451	470	397
Specific gravity, (air = 1) ...	0·40	0·65	0·42	0·54	0·48
Gaseous yield, therms/gal ...	1·10	0·90	1·26	1·82	1·85
Steam decomposed, % ...	12·1	1·9	13·4	24·1	28·0
Carbon deposited, % of oil used ...	40·3	47·6	47·8	4·2	6·9
Composition of gas, %					
CO_2 ...	12·8	4·8	12·7	16·5	13·0
CnHm ...	1·9	25·5	1·9	5·1	1·6
CO	4·0	2·6	4·7	8·3	14·6
H_2	65·0	40·4	62·0	53·0	57·6
CH_4 ...	15·0	25·5	16·8	16·8	12·8
C_2H_6 ...	1·3	1·2	1·9	0·3	0·4

Catalyst Development

In the laboratory survey of a number of catalysts for the gasification of oil in steam it has been shown that the oxides and carbonates of both alkali and alkali earth metals are capable of having a very marked effect in promoting the reaction. It is possible with the correct operating conditions to obtain almost complete gasification of a normal gas oil without the formation of any tar and with very little deposition of carbon. The gas produced is low in unsaturated hydrocarbons, and high in hydrogen, being comparable with coal gas in specific gravity, although rather too low in calorific value. The yield of gas will amount to about 1·8 therms per gallon, the excess over the heat content of the oil representing heat absorbed in the process.

Other materials such as alumina and magnesia have very little effect in promoting the steam/carbon reaction and under no condition will it be possible to effect complete gasification. Indeed, the carbon deposited may amount to some 40-50 per cent of that present in the oil.

A few typical results illustrating these points are shown in Table II.

The effects of temperature and rate of throughput are also interrelated in that, with a given steam:oil ratio, the proportion of oil gasified may be maintained almost constant at higher rates of oil throughput provided that the temperature is also suitably increased. Furthermore, by reducing the steam:oil ratio it is also possible to limit the formation of water gas and produce a gas almost entirely similar to coal gas in characteristics, although in these circumstances the yield of gas is somewhat reduced and the formation of carbon increased. These points are illustrated by the laboratory results shown in Table III.

The gas-making properties of petroleum products other than gas oil as determined by laboratory experiments are shown in Table IV, in which it may be seen that the lighter products tend to produce a richer gas for the same reaction temperature, but this may be corrected by working at a suitably higher temperature.

A great deal of other experimental work on the gasification of petroleum oils has been carried out, but sufficient results have been shown to demonstrate that all the elements exist for a flexible process for oil gasification, in which, by varying the conditions of operation, gases of a moderate range of calorific value may be produced and output may be regulated over fairly wide limits.

Process Design

It is relatively simple in laboratory apparatus to provide by external heating all the heat required for the decomposition of oil and for the endothermic carbon/steam reaction, but in a plant dealing with several tons of oil per day the dimensions of the gasification unit required will tend to preclude any such method if the plant is to be kept in simple form, thereby avoiding the use of expensive materials of construction.

It is essential to provide means whereby large quantities of heat can be made rapidly available for these reactions. Moreover, the laboratory experiments have shown that if gas of about the same calorific value as town gas is required some carbon must be left ungasified, although its deposition is controllable and may be substantially avoided if gas of low calorific value, suitable only for dilution of coal gas, is required. In any indirect method of heating, this carbon would, however, be an embarrassment, as the process would require to be interrupted from time to time in order to remove it. Moreover, prolonged working in the presence of undue quantities of carbon will have an adverse effect on the gas yield and quality.

The presence of this carbon may, however, be advantageous as the source of the heat required by the process, just as in both the water gas process and in fluidization processes, the combustion of carbon is used to provide the heat required for a desired reaction in a subsequent phase. As in the fluidization technique, the catalyst for oil gasification can be made to perform the dual function of promoting the reaction and of storing the heat required.

This modern technique of catalyst fluidization with its many obvious advantages, including uniform bed temperature and continuity of production, would seem the natural line of development. As yet, however, there is only a limited experience in the U.K. of such processes and, indeed, none in the temperature range of the gasification reactions of this process.

The development of the process has thus been directed to the "blow" and "run" technique, which has been widely used in the manufacture of water gas from steam and coke and in producing hydrogen from steam and iron. It was clear that a process on similar lines should consist essentially of two phases. During gasification, the reacting steam and oil would rapidly extract heat from the catalyst—at the same time depositing carbon; on the subsequent blow to burn off carbon this heat would be restored, any deficiency being made up by burning oil or gas. In order to operate the process with the maximum efficiency as much heat as possible must be returned to the system, and it became evident that the elements of a suitable type of plant would consist essentially of:

(*a*) a chamber containing catalyst material of suitable form;

TABLE III

GASIFICATION OF GAS OIL AT VARYING STEAM: OIL RATIOS AND AT VARYING TEMPERATURES

Catalyst: 25 per cent CaO on ignited bauxite

Temp. °C	*Steam rate g/hr*	*Oil rate g/hr*	*Steam: oil ratio*	*Gas yield therms/gal*	*C.V. of gas B.t.u/cu.ft.*	*Carbon deposited % of oil*
900	27·2	8·4	3·24/1	1·96*	348	4·4
900	25·8	13·3	1·94/1	1·82*	396	10·8
900	24·1	22·8	1·05/1	1·49	463	20·9
900	15·3	23·7	0·65/1	1·22	527	32·3
950	15·0	23·7	0·64/1	1·28	442	41·6
1000	15·3	40·4	0·38/1	1·33	463	41·4
1040	43·6	116·0	0·38/1	1·46	453	27·7

*The excess over the heat content of the oil represents heat absorbed in the process.

(*b*) a heat exchanger extracting heat from the gas produced and returning it to the system as sensible heat in the air used in the re-heating process; and

(*c*) a heat exchanger returning to the system, as superheat in the steam, the heat extractable from the waste heating gases. After preheating the steam, any useful heat in the waste gases could be applied to raising steam for power and process.

Design of Catalyst

An important consideration in the development of the process is based on the blow and run technique related to the design of catalyst shapes. It was essential that they should be capable of withstanding rapid changes in temperature, and at the same time provide a high heat storage capacity. Moreover, it was necessary that they should not be too small in size in order that there should not be too great a resistance to the flow of gas or air. Most important of all, the material should be capable of withstanding temperatures which might arise through the uncontrolled combustion of carbon without fusion or loss of activity.

To meet these requirements, the catalyst is made in ring form, 1¼ inch outside diameter, 1¼ inch long with a wall thickness of ¼ inch, and is prepared from finely ground magnesite and precipitated chalk, which, after moulding in the wet state and subsequent air drying, is fired at 1400° C.

Using catalyst shapes of these dimensions, the gasification of oil was reinvestigated under cyclic operating conditions in a pilot plant designed to treat several gallons of oil per hour. The experiments were carried out over a wide range of temperature and throughput, and were successful in confirming the laboratory work on gas oil and establishing the practicability of the process. Even more important, they also showed that equally good results could be obtained with heavy fuel oil of about 1000 seconds viscosity.

Encouraged by these results the decision was made to develop the process to a scale at which some 150 gallons per hour could be gasified. Owing to the lack of full-scale working experience, the design of the plant was of necessity based on theoretical data aided in some measure by operational results from the pilot plant.

TABLE IV

GAS-MAKING PROPERTIES OF PETROLEUM PRODUCTS

Gas or oil feed rate: equivalent to 7·8 grams carbon per hour. Steam: carbon by weight: 1·83:1. Catalyst: standard lime-magnesite catalyst.

Feed	*Gas oil*	*Paraffin*	*Commercial butane*	*Commercial propane*	*Methane*	*Methane*
Temperature, °C	925	925	925	925	925	1,075
Oil feed rate (cc/hr)	10·85	11·35	—	—	—	—
Gas feed rate (cu.ft/hr)	—	—	0·128	0·175	0·510	0·700
Steam rate (g/hr)	14·25	14·25	14·25	14·25	14·25	17·00
Volume of gas made (N_2 free) (cu.ft/hr at 60° F and 30 inches Hg.)	0·90	0·85	0·79	0·79	0·61	1·43
(cu.ft/cu.ft. feed)	—	—	—	—	—	2·05
Composition of gas %						
CO_2	9·1	8·5	8·6	9·4	4·3	2·6
CnHm	3·6	5·0	3·5	2·0	0·3	2·3
CO	18·7	26·3	14·2	15·6	2·3	13·2
H_2	53·1	45·5	41·3	43·3	16·1	53·2
CH_4	14·1	14·5	31·6	29·3	77·0	28·7
C_2H_6	1·4	0·2	0·8	0·4	—	—
Calorific value (B.t.u/cu. ft.)	464	476	560	518	842	544
Specific gravity (Air = 1)	0·49	0·56	0·52	0·51	0·53	0·39
Total Gaseous yield:						
(*a*) as therms per gal oil	1·74	1·61	—	—	—	—
(*b*) as therms per therm feed	1·05	1·01	1·10	0·93	1·02	1·19

Prototype Commercial Plant

This plant, shown diagrammatically in Fig 1, was erected at the Sydenham works and was first put to work in February 1953. Since then a second plant similar in design and capacity has been put to work at York where further valuable experience of the process has been gained.

The plant is designed with three main vessels of steel lined with refractory and insulating brick, the catalyst unit in the centre having on either side regenerator units filled with refractory chequer bricks. It is arranged for cyclic operation based on a gas-making run and a heat-restoring blow in the opposite direction, the heat in the blow gases being used for superheating the process steam and the heat of the make-gases for preheating the air used on the blow in the appropriate regenerators.

The catalyst unit is 8 feet 6 inches external diameter with an overall height of 16 feet 6 inches and contains rings of lime-magnesite catalyst as a bed 6 feet in diameter and 6 feet deep supported on refractory arches. The rings vary in size from $2\frac{1}{2}$ inches diameter for the top 9 inches and bottom 18 inches with $1\frac{1}{4}$-inch rings in between.

The steam preheater, also 8 feet 6 inches external diameter, contains refractory chequers to a depth of 6 feet 9 inches and is connected to the catalyst vessel by a cross-over flue at the top. The air preheater, connected at its base to the bottom of the catalyst vessel, is 7 feet 9 inches diameter and 12 feet 6 inches high and is packed with refractory chequers to a depth of 11 feet 3 inches.

An off-take at the base of the steam preheater leads the blow-gases to a waste heat boiler raising steam at 120 psig which is passed into the works system.

At the top of the air preheater an off-take leads the hot make-gas together with undecomposed steam through a water wash-box in which the temperature of the gas is reduced from about 250° C to about 75°-80° C and a large proportion of the tar contained in the gas is precipitated. The gas then passes to a washer cooler and thence through a creosote-filled Livesey washer before being measured in a Connersville meter and passed into the works gas mains.

Services and Method of Operation

The services to the plant for oil, process and purge steam, air, and auxiliary heating gas follow conventional lines and require no special comment. Each is measured by recording instruments, the required rate being set by hand control.

Sequence operation of the ON-OFF valves controlling the flow of oil, steam, make-gas, air, heating gas, and purge steam is controlled by a motor-driven seven-train operator with mechanical linkages to the valves. Safety interlocks are provided to ensure correct sequence in operation.

Air for the blow is admitted to the top of the air regenerator where it is preheated as it flows down the chequerwork. Any gas (or oil) required for heating is supplied at the base of this vessel, the resulting products of combustion together with a very large excess of air passing upwards through the catalyst bed in which the deposited carbon is burnt away; it may also be supplied to the top of the steam preheater. The resultant waste gases then pass downwards through the steam regenerator.

During the subsequent gas-making phase of the cycle, steam is admitted at the base of the steam regenerator, in which it is highly superheated as it passes to the top. Here, it meets the oil which is sprayed on to the top of the steam preheater chequers. The oil vapour and superheated steam pass to the catalyst vessel, from which the resulting gas, tar vapours, and undecomposed steam are then passed upwards through the air regenerator to the gas off-take.

Between the air-blowing and gas-making phases of the cycle steam is blown through the vessels as a purge to waste.

Although the catalyst bed comprises some 5 tons of material and has a very high heat capacity, for satisfactory working conditions the duration of the cycle may be varied only between very narrow limits. It is clearly undesirable that it should be so short that an appreciable proportion of the time is lost in valve changes and in the purging operations between the "blow" and "run" phases of the cycle, but, apart from this, a lower limit is set by the need for sufficient time during the "blow" to remove the carbon deposited during the previous "run". Experience has shown that this phase of the cycle requires at least $2\frac{1}{2}$ minutes, irrespective of the quantity of carbon to be burnt and the excess quantity of air used. In this connexion, it should be noted that in order to ensure removal of the carbon deposited, the air required is some two to three times that theoretically needed. Although it would seem that this time may conveniently be reduced by increasing the air velocity through the bed, less efficient use of the air would be made with some risk of extinguishing the combustion of the carbon through excessive heat losses.

An upper limit is set first by the quantity of carbon permitted to accumulate in the catalyst bed in each cycle and also

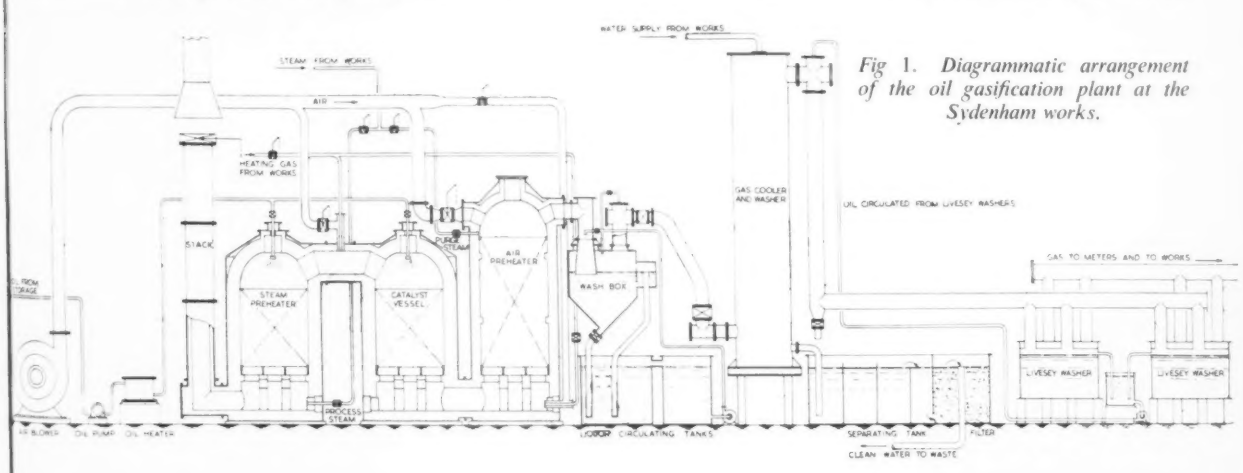


Fig 1. Diagrammatic arrangement of the oil gasification plant at the Sydenham works.

TABLE V

TYPICAL OPERATING CYCLE FOR HEAVY FUEL OILS AND GAS OIL

Duration of the phases	*Seconds*		*%*	
Gas Making				
process steam	150		44·2	
oiling		109		32·1
continuation steam		37		10·9
Blowing				
air	161		47·3	
heating gas		144		42·4
Purges	21		6·2	
Lost time between phases	8		2·3	
	340		100·0	

by the amount of heat available in the top layers of the steam regenerator chequer work for evaporation of the required amount of oil. Even so, there is a limit to the rate at which this heat can be transferred from within the refractories to the oil, and in order to ensure complete evaporation of the oil from the surfaces it is necessary to continue the flow of steam for some time after closing the oil valve. Without this precaution unevaporated oil residues will give rise to a copious discharge of smoke from the stack during the early stages of the blow period.

These requirements have therefore fairly clearly defined the duration of the operating cycle for the gasification of a heavy fuel oil, a typical example being given in Table V.

TABLE VI

RESULTS OF PERIOD TESTS ON DIFFERENT OILS

Type of oil	*Fuel oil*			*Gas oil*
	950 *sec*		200 *sec*	
Period of test	22	28	12	12
Operating time, hours ...	474	488	258	249
Oil used, gal				
total during test ...	55,415	51,908	32,511	31,900
per cycle	11·0	10·1	11·9	12·2
per hour	117·0	106·5	126·2	128·2
Steam used, lb gal of oil				
with oil	18·26	16·74	17·40	9·96
for purges	3·96	4·42	4·15	3·28
total	22·22	21·16	21·55	13·24
Air used, cu.ft gal ...	978	987	833	882
Gas made and used				
total made, mill. cu.ft.	13·570	13·703	8·622	8·871
total made, therms ...	68,144	64,758	41,644	43,675
used for heating, therms	3,137	3,306	2,957	5,710
made per gal of oil, therms	1·23	1·25	1·28	1·37
used per gal of oil, therms	0·06	0·07	0·09	0·18
net yield per gal of oil, therms	1·17	1·18	1·19	1·19
Average calorific value of gas made, B.t.u cu.ft. ...	502	473	483	492
Tar made, (dry basis)				
total, gal	4,600	5,400	3,150	1,790
per 100 gal of oil ...	8·3	10·4	9·7	5·6
average specific gravity	1·21	1·22	1·17	1·20

For the gasification of more volatile petroleum products, such as a light distillate, it is clearly obvious that the process steam need only be continued after the oil valve is shut off for a period long enough to ensure that the gaseous products of the reaction are swept through to the outlet of the plant. It is thus possible to extend the duration of the oiling phase and so increase the productivity of the plant.

While it has been possible to establish satisfactory and efficient cycles for the operation of this process it should not be thought that the finality has been reached. One line of development in the use of heavy oil should lie in increasing the rate of oil evaporation in order to increase the duration of the oil phase in relation to the blow.

Control of Process

While the calorific value of the gas produced is determined mainly by the temperature conditions in the catalyst bed, it is clear that actual temperatures in a bed 6 feet deep and 6 feet wide cannot be measured, although reference temperatures may be obtained at various points and are useful indications of the temperature profile.

TABLE VII

CHARACTERISTICS OF THE GAS PRODUCED

Type of oil	950 *sec heavy oil*		200 *sec fuel oil*	*Gas oil*
Calorific value of gas, B.t.u cu.ft.	502	473	483	492
Specific gravity (Air = 1)	0·55	0·58	0·55	0·52
Composition, %				
CO_2	11·0	12·1	10·5	5·8
O_2	0·4	0·6	0·3	0·4
CnHm	6·7	5·2	5·1	4·2
CO	14·7	16·7	17·2	18·3
H_2	48·9	48·2	49·2	50·3
C_2H_6	0·6	0·6	0·3	0·5
CH_4	14·7	12·9	14·4	15·7
N_2	3·0	3·7	3·0	4·8
Benzole, gal/1000 cu.ft. ...	0·24	—	—	—
Hydrogen sulphide ...	250	—	—	60
Total organic sulphur ...	30–40	—	—	—
Ammonia	Nil	Nil	Nil	Nil
Hydrogen cyanide ...	Nil	Nil	Nil	Nil

The most useful control is on calorific value itself, too high a calorific value indicating a lower working temperature and vice versa. When the desired throughput of oil and steam: oil ratio have been set, adjustments to the catalyst bed temperature may be made by varying the auxiliary heat supplied and by increasing or reducing the heat extracted from the catalyst bed by varying the air flow. By this means close control of the calorific value can be obtained.

Results

During the development of the process a wide range of petroleum fractions have been examined ranging from heavy fuel oil of 950 sec viscosity (Redwood No. 1) to butane.

Typical results from test runs on three particular oils—heavy oil of 950 sec viscosity, 200 sec fuel oil, and gas oil—are shown in Table VI. Throughout each particular test there was remarkably little variation in the composition of the gas produced and no great difficulty was experienced in maintaining the daily calorific value with ± 10 btu/cu.ft. of that set for the experiment at the commencement.

The make-oil conversion efficiencies obtained during the test runs on the full scale plant are very similar to those obtained in the earlier pilot plant experiments—1·23 to 1·28 therms per gallon for the heavier oils and 1·37 for gas oil. From time to time, however, during the working of the plant somewhat higher yields have been obtained—1·35 to 1·40 therms per gallon—and it would appear that on these occasions oil of better quality has been available.

The tar produced—8-10 per cent for heavy oil and 6 per cent for gas oil—is much less than is normal with the majority of oil gasification processes. It is highly aromatic in character and very similar to a normal well-cracked high-temperature tar from coal.

An unfavourable feature of the gases derived from the heavy oils, not associated with the gas from lighter fractions, such as gas oil, is the high carbon dioxide content (10-12 per cent) and the consequent high specific gravity. The reason for this probably lies in the very large excess of steam used in the gasification of these oils. It will thus be necessary to consider chemical methods of extraction of part of this CO_2 from the gas in those cases where it is likely to prove an embarrassment.

As would be expected, the concentration of hydrogen sulphide and organic sulphur compounds is highest in gas made from heavy oils. Although these oils contain some 3-4 per cent of sulphur, only about one-third appears in the gas, the greater part being absorbed by the catalyst during the gas-making phase of the cycle and given up to the waste gases as oxides of sulphur during the "blow". None remains permanently fixed in the catalyst.

TABLE VIII

THERMAL BALANCES

Type of oil	950 *sec heavy oil*		200 *sec fuel oil*	*Gas oil*
Calorific value of gas made, B.t.u cu.ft.	502	473	483	492
Heat input (therms/gal of oil)				
process oil: potential heat...	1·760	1·758	1·754	1·670
sensible heat ...	0·006	0·006	0·006	Nil
process steam: total heat ...	0·211	0·193	0·206	0·115
air	Nil	Nil	Nil	Nil
auxiliary heat: potential heat	0·057	0·064	0·091	0·179
purge steam: total heat ...	0·046	0·051	0·048	0·038
	2·080	2·072	2·105	2·002
Heat output: (therms/gal of oil)				
gas made: potential heat ...	1·230	1·247	1·282	1·369
sensible heat ...	0·031	0·030	0·035	0·039
undecomposed steam: total heat	0·190	0·162	0·173	0·090
tar: potential heat	0·174	0·207	0·185	0·115
sensible heat	0·004	0·005	0·005	0·003
waste gases: sensible heat ...	0·255	0·256	0·202	0·200
purge steam discharge: total heat	0·062	0·069	0·063	0·048
total heat accounted for ...	1·946	1·976	1·945	1·864
radiation and convection losses and errors ...	0·134	0·096	0·160	0·138
	2·080	2·072	2·105	2·002
Efficiencies				
conversion efficiency, %* ...	69·9	70·9	73·2	82·0
overall process efficiency, %†	70·7	73·4	71·0	76·1

* Conversion efficiency = gas/oil.

† Overall process efficiency = gas/[(oil + aux. heat + steam) − (tar + steam raised)]

TABLE IX

HEAT BALANCE OF CATALYST BED

(*Tests on Heavy Fuel Oil—500 B.t.u cu/ft. Gas*)

Heat lost during run	*Therms gal of oil*	*Heat gained during blow*	*Therms gal of oil*
Sensible heat of "make" gas and steam leaving bed ...	0·175	Sensible heat in air regenerated from product gases ...	0·103
Sensible heat in purge steam	0·019	Deduct: sensible heat of waste gases leaving bed	−0·290
Heat of decomposition of oil	0·046	Radiation and convection losses ...	−0·020
Endothermic heat of water gas formation	0·051	To balance: heat of combustion of carbon (≡ 30·6 % carbon on oil used) ...	0·432
Radiation and convection losses	0·020		
Deduct: sensible heat in steam and oil regenerated from waste gases	−0·086		
Total heat lost ...	0·225		0·225

Thermal Balance of the Process

In any thermal process the construction and study of heat balances are an essential exercise, and these balances for the working results already given are shown in Table VIII.

They show clearly that the available sensible heat in the waste "blow" gases at suction pyrometer temperatures between 600° and 700° C, and the potential heat in the tar produced are more than sufficient to raise all the steam required in the gasification. Indeed, the energy available in the steam raised from the waste gases at, for example, 200 psig and 500° F and exhausting through turbines at 20 psig pressure, is more than sufficient to provide all the power requirements of the process, so that only a small quantity of tar need be burnt to raise steam for the process and then only when gasifying the heavier oils.

It is on this basis that the efficiencies for the various tests have been calculated. The overall process efficiency takes account of the tar produced and the potential steam raising capacity of the waste gases being expressed in the thermal values of

Gas/[(oil + auxiliary heat + steam − tar + steam raised)].

Conversion efficiencies, *i.e.* yield of gas related to the oil used, are also shown for comparison. Thus, the expected overall process efficiency when using heavy fuel oils is about 70-73 per cent and somewhat higher when using the lighter oils.

The thermal economy effected by the use of the regenerative system is shown by the heat balance over the catalyst bed given in Table IX and illustrated in Fig 2, based on data for the production of 500 B.t.u. gas from heavy oil. By the regeneration of heat from the gases leaving the catalyst bed, 0·103 therm per gallon has been recovered from the product gases and undecomposed steam and 0·086 therm from the "blow" gases; a total of 0·189 therm thus being returned to the bed. In a non-regenerative system this heat would have had to be supplied from outside sources by combustion of oil, tar, or

gas. As only 0·06 therm of heat was supplied from external sources, the use of the regenerative system has clearly resulted in the saving of 0·129 therm per gallon of oil gasified.

In operating the regenerative type of plant the most important factor governing the control of the process is the regulation of the temperature distribution within the catalyst bed, in order that, as far as possible, the whole of the catalyst is available for gasification of the oil. It is inevitable with a cyclic regenerative type of process, in which the "blow" and "run" phases of the cycle are in opposite directions that the highest temperatures will tend to build up somewhere near the middle of the bed and for the greater part of the carbon to be deposited in that region. Consequently, it is necessary to use sufficient excess air during the blow not only to dissipate the excess heat developed in this zone of active combustion, but also to transfer heat to those parts of the catalyst bed and steam preheater which have lost heat to the steam and oil vapours and been chilled by vaporization of the oil during the "run".

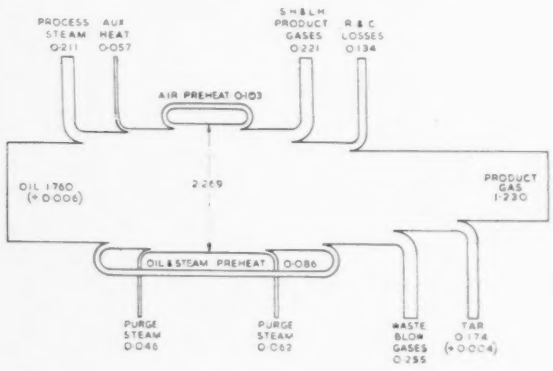
Whether any auxiliary supply of heat is required will depend on the type of oil gasified and the calorific value of the gas required. Thus, the quantity of carbon deposited on the catalyst when making 500 B.t.u. gas from heavy oil provides just about sufficient heat during the "blow" to maintain thermal stability within the catalyst without the use of any auxiliary heat below the catalyst bed, although it is necessary to supply a little additional heat to the steam preheater to aid the vaporization of the oil. When, however, gas oil and lighter hydrocarbons are used to make gas of the same calorific value, less carbon is deposited, and the catalyst bed can only be maintained in balance by burning a small quantity of fuel in the preheated air supplied to the bed.

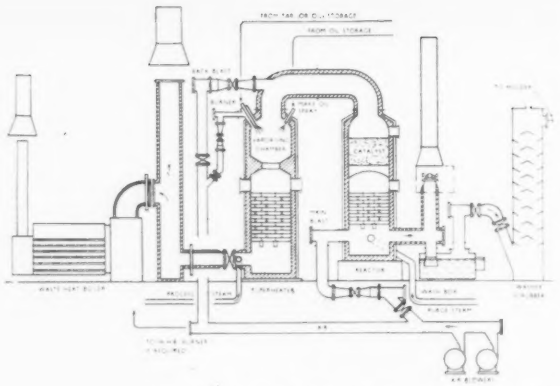
The function of this auxiliary heat is to raise the temperature of the air already preheated in the air regenerator to the temperature of the catalyst at the base of the bed and is not intended as the main source of the heat for the endothermic reactions of the process. For these, the heat is best supplied by the combustion of carbon deposited at the point where it is required and the amount generated can be regulated by adjusting the quantity of steam used in relation to the oil.

Design of Future Plants

The experimental work on the Sydenham plant, the first working the process on a production scale, has revealed a

Fig 2. Sankey diagram of heat balance, Segas process. Therms per gallon of oil. Production of 500 B.t.u. gas from 950 sec heavy fuel oil.





By courtesy of the Power-Gas Corporation Ltd

Fig 3. Segas catalytic oil gas process.

number of points where improvement should be possible in the design of future units.

One of these concerns the vaporization of the oil. It is clear that spraying of the oil on to the catalyst is most undesirable. Spraying of the oil on to the upper layers of the steam preheater chequers causes fairly rapid disintegration of the bricks which cannot withstand the repeated cycles of chilling with oil and burning out of carbon and oil residues for more than a few months.

Another point of weakness concerns the dynamics of the flow of the mixture of steam and hydrocarbons to the top of the catalyst bed and of the flow of air to the catalyst base. The radial connexions from the steam regenerator and air regenerator to the catalyst vessel tend to cause uneven distributions through the catalyst bed and make control of the process somewhat more difficult.

These and other minor points have led to a design of plant, evolved in collaboration with the Power-Gas Corporation, to use fuel oils as the main feedstock in which the primary elements—the steam preheater, catalyst bed, and air preheater—together with a vaporizing chamber are arranged in two vessels. The main features are illustrated in Fig 3. Each of the vessels is divided into two zones. The superheater has in its upper part an oil vaporizing chamber below which are the steam preheater chequers; the reactor has the catalyst bed in the upper portion and below this is the chequer-filled air preheater.

The vessels are so connected at the top that even distribution of oil vapour and steam over the catalyst bed is ensured.

A further advantage of this arrangement is that in both the steam preheater and air preheater sections the effects of buoyancy will tend to give even flow of the gases, since a gas hotter than its surroundings, flowing downwards, will automatically tend to distribute itself uniformly. In the same way, with gas colder than its surroundings, flowing upwards, buoyancy will also assist even distribution. In the catalyst bed, flow distribution is mainly controlled by the relatively high resistance, and will be uniform provided the differences in the resistances of the various channels are small in comparison with the total.

Direct contact of oil with the steam preheater chequers will be avoided by spraying the oil in finely atomized form into the vaporizing chamber where it meets the highly superheated steam. The purpose of the refractory throat is to

impart sufficient velocity to the steam, that oil droplets may be prevented from passing on to the chequer bricks below.

The vessels are also provided with the necessary connexions for the supply of process oil, auxiliary heating oil, process steam and purge steam, air for the combustion of carbon and burner air, and exits for the waste gas to a waste boiler and for make-gas to purification plant.

The hot make-gas leaving the generator vessel contains tar, carbon, and naphthalene together with other impurities such as H_2S. In passing through the wash-box, its temperature is reduced to about 70°-80° C, and some half to two-thirds of the tar and carbon removed. Cooling of the gas to normal temperatures is then effected in a washer of the direct contact type in which the gas and water are brought into intimate countercurrent contact, and in which the major portion of the residual tar, carbon, and naphthalene present is removed. Final removal of the residues of these impurities may then be effected by electro-precipitation and by oil washing with a suitable solvent.

Acknowledgments

The author is indebted to the South Eastern Gas Board for permission to present this paper.

He would also like to express his appreciation of the help and guidance given by the chief technical officer of the Board and by the chief chemist. With the latter the author has been privileged to present two papers to the Institution of Gas Engineers on the development of the process, which have been freely drawn on in this paper.

The author also gratefully acknowledges the co-operation of his many colleagues in the engineering and chemical departments of the Board.

NEW OIL BERTHS ON MANCHESTER SHIP CANAL

In his annual address on 28 February, Sir Leslie Roberts, C.B.E., chairman of The Manchester Ship Canal Company, said that the Mersey Docks and Harbour Board had obtained Parliamentary permission to construct two deep water oil berths off Tranmere Beach, with a connecting jetty. Tankers had been gradually growing in size, he said, and those of the latest dimensions with their deeper draughts were not able to negotiate the approach channel to Queen Elizabeth II Dock. It therefore became essential for the "Shell" Company to secure alternative berths in the Mersey so as to be able to employ ships of the most economical size for the import of the crude oil needed for their refinery at Stanlow.

Since the Suez crisis began, the demand for larger tankers had quickened, said Sir Leslie, and many operators were contemplating vessels of 65,000 tons and more for the U.K. trade. The crisis and its aftermath are bound to affect, probably to a major extent, the oil traffic of the Port of Manchester and the net effect would probably be a change of pattern rather than a diminution in total volume. If certain plans came into being, there should be reasonable compensation for the loss of imports of crude oil for which the Queen Elizabeth II Dock was designed. The international situation might cause some delay or postponement of those plans, but if U.K. economy continued to be sound and industry continued to progress, favourable results should emerge at the right time.

Sir Leslie also referred to the propane lights along the Canal from Eastham to Stanlow oil docks. Although unexpected difficulties had been encountered, they were now ready for use and would, he hoped, facilitate night navigation in this length of the Canal.

PETROL SUPPLIES AND PRICE INCREASE

On 18 March, the Paymaster-General announced that improved supplies of petrol were sufficient to allow the basic ration for private cars to be increased by 50 per cent to 300 miles a month in the next rationing period beginning on 17 April. Concurrently, he announced that the retail price of petrol would be increased by 1d. per gallon.

MIDDLE EAST OIL PIPELINES

During the period 18 to 20 March leading executives of international oil companies interested in Middle East oil, met in London to discuss problems connected with the pipeline transport of the increasing quantities of Middle East oil that will be needed to meet world demands in the next decade.

Chairman was the Hon. Sir Francis J. Hopwood, a managing director of the Royal Dutch/Shell Group, and the principals present were:

R. G. Follis (chairman, Standard Oil Co. of California);

N. A. Gass (chairman, The British Petroleum Co Ltd);

A. C. Long (chairman, The Texas Company);

V. de Metz (president director-general, Compagnie Français des Petroles);

M. J. Rathbone (president, Standard Oil Company (New Jersey));

R. Siegel (director, Socony Mobil Oil Company Inc.);

W. K. Whiteford (president, Gulf Oil Corporation).

At the conclusion of the meeting it was stated that a number of committees had been set up to consider among other things the possible routes and capacities of the pipelines required; construction and engineering problems; availability of steel plate and pumping equipment; and finance. The co-ordination of the work of these committees will be carried out by a committee, the membership of which will include London representatives of the U.S. and French companies, as well as of the Royal Dutch/Shell and the British Petroleum Company.

First Tanker Loading from I.P.C. Pipeline at Banias

The 26,000-ton Mobil Oil tanker, *Aramis*, was loading on 13 March from the I.P.C. pipeline at Banias, Syria, and was the first tanker to take a cargo of oil from the I.P.C. pipeline since the pumping stations were blown up in November 1956.

The *Aramis* was due to leave Banias for Le Havre on 14 March.

Kuwait Symposium on Reservoir Data

An Achievement in Organization

The Kuwait Branch is situated centrally in that vast oil-producing area, the Middle East. To the north the oilfields of Iraq and Iran; to the south Bahrain, Qatar, and Oman. Basrah, just round the corner, is about one hundred miles away, while the remainder averages five hundred miles distant. That is the measure of the achievement of the IP Kuwait Branch in organizing and successfully promoting a technical symposium on the "Acquisition and or Analysis of Reservoir Data".

2/3 February. Modern magic carpets flew in from London, Teheran, Abadan, Mosul, Kirkuk, Basrah, Dhahran, Qatar, and Bahrain carrying two IP Council members and a Schlumberger representative from London, an IP vice-president from Teheran, whose take-off was considerably delayed by a snowstorm, and full representation of all branches of technology concerned with oilfield operations—geologists, petroleum engineers, reservoir engineers, development engineers, physicists, and a mathematician. A minor League of Nations with nationals from the U.K., the U.S.A., France, Iraq, and Iran. A total of thirty-five guests to be met at Kuwait Airport and transported the odd twenty miles to Ahmadi where the Kuwait Oil Company's camp is situated. With a further five guests from neighbouring Aminoil, a total of forty to be accommodated in the K.O.C. Guest House and in the houses of the K.O.C. staff. A task of major dimension carried out without a hitch through the full and able co-operation of the K.O.C. management and the untiring endeavours of the Branch chairman, R. K. Blackwood, M.B.E., the Branch hon. sec, R. J. L. Stephens, and the members of the Kuwait Branch.

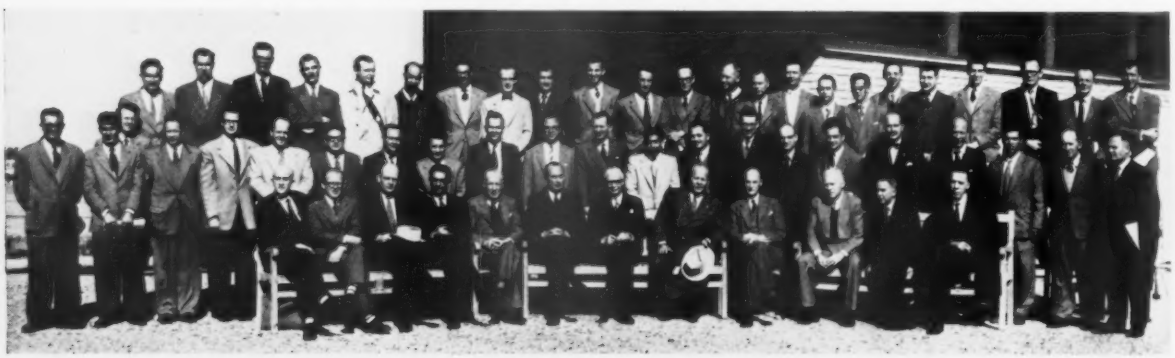
Ahmadi, the only rise in the neighbouring miles of flat desert, overlooks the Persian Gulf from its 400-foot height. The large main office at the apex of the road system dominates the camp. A network of modern roads, on the U.S. principle of avenues and streets, serves the housing. The guest house, below the main office, comprises a central block with a large lounge and cocktail bar, a large restaurant, and on either wing separate blocks with suites of rooms. All are modern in design and furnishing and are surrounded by gardens won from the desert. Further down is the display centre, a modern innovation serving the two purposes of information and instruction, with blown-up photographs of field operations, scale models of sections of the fields, core specimens, and press-button indication by flashing lights of the progress of the crude oil from well head to tanker. All follow the operations in sequence and carry detailed script in English and Arabic. In one wing is a lecture hall with cine projector and screen for instruction purposes, and used on this occasion for the technical symposium lectures.

Gathered outside the Kuwait Oil Company's Display Centre are those who attended the Kuwait Symposium.

Back Row : *R. Campourcy (Schlumberger); D. Fate (Aramco); J. Beasley (K.O.C.); G. T. Becker (K.O.C.); B. T. Yokum (Aramco); H. I. Ashqar (C.A.T. Co.); P. Branson (Qatar Petroleum Co.); J. Turnbull (Mosul Petroleum Co.); P. D. A. O'Connell (Q.P.C.); K. R. J. Trott (K.O.C.); R. Milne (M.P.C.); R. V. Browne (I.P.C.); C. C. Von Elm (K.O.C.); E. J. Sole (K.O.C.); L. M. Craig (K.O.C.); H. K. Grant (K.O.C.); A. de Graaf (Basrah Petroleum Co.); S. M. Sims (Basrah Petroleum Co.); A. G. Cox (B.P.C.); J. L. Hopkinson (B.P.C.); G. R. August (Aminoil); L. Ford (Saybolt); L. B. Milam (Aramco).*

Middle Row: *A. Palustran (Schlumberger); J. Trewhella (K.O.C.); A. J. Horan (K.O.C.); W. C. Renton (K.O.C.); E. S. Malloch (K.O.C.); A. L. Smither (K.O.C.); T. C. Pearse (I.P.C.); S. B. Ford (Q.P.C.); A. J. Thomson (M.P.C.); P. J. Benn (Bapco); W. H. Cotter (Bapco); A. Scrutton (Rendel, Palmer and Tritton); T. I. Shafiq (I.P.C.); H. Samara (I.P.C.); M. J. Heaton (B.P.C.); Dr J. Tavana (National Iranian Oil Co.); T. H. Griffiths (I.P.C.); D. M. Barnes (I.P.C.); Dr D. Bunyon (I.P.C.); A. Marjani (Consortium); A. I. Hultgren (K.O.C.); R. H. Zinszer (Aramco).*

Seated: *A. Poupon (Schlumberger); R. J. L. Stephens (K.O.C.); W. C. Buie (K.O.C.); H. Farkhan (N.I.O.C.); J. S. Parker (IP Council member and Lobitos Oilfields Ltd); R. K. Blackwood, M.B.E. (K.O.C.); A. C. Hartley, C.B.E. (IP Vice-President); L. T. Jordan (general manager, K.O.C.); M. E. Hubbard (IP Council member and The British Petroleum Co.); E. Boaden, O.B.E. (K.O.C.); G. Hetherington (K.O.C.); O. M. Brown (Aramco).*



At the cocktail party given by Mr and Mrs L. T. Jordan (left) *for the delegates of the Symposium: Mrs J. M. Dougary, J. S. Parker, and R. K. Blackwood, M.B.E.*

4 February. The majority of the delegates had arrived by mid-day. To fill in the intervening time until the start of the symposium the K.O.C. provided cars and guides for visits to the oil-loading jetty, the Burgan field wells, gas separating plant, main transit pump station with a gas turbine generator carrying part of the load, the petroleum engineering laboratories to inspect core analysis equipment, and the P.V.T. laboratory.

In the evening the K.O.C. general manager, L. T. Jordan and Mrs Jordan were the hosts at a cocktail party and buffet supper provided for the delegates and the Branch committee members in the restaurant at the guest house. The introductions and the excellence of the fare rapidly eliminated the initial stiffness of such assemblies.

Taking refreshment at the Display Centre: A. Marjani, P. J. Benn, B. T. Yokum, J. Turnbull, and W. H. Cotter.

5 February. Prior to the official opening of the symposium a group photograph was taken outside the display centre. After blinking off the effects of Middle East sunshine a move was made to the lecture room, where the chairman of the Kuwait Branch opened the proceedings with a welcome to all those present and his best wishes for the success of the discussions. The lecture chairman was introduced, took the chair, and the following paper was read and discussed:

"Distribution of Fluid Properties in a High Relief Oilfield and its Effect on the Material Balance".
Read by Howard Grant (K.O.C.). Chairman: W. C. Renton (K.O.C.).

In the evening a non-technical lecture open to all was given in the Clubhouse by M. E. Hubbard, IP Council member. Copies of the paper entitled "The Pattern of Oil Demand in the Eastern Hemisphere and Europe" were circulated to the majority of the 130 present. Chairman: J. S. Parker, IP Council member. The lecture was well received and gave rise to a lively discussion. Pertinent information was imparted by G. Hetherington (K.O.C.) who, busy with his slide rule during the lecture, came up finally with the answer that according to his best calculation if the forward statistical requirements were met the oilfield life was fifteen years.

6 February. The whole day was taken up by the reading and discussion of the following papers:—

"Geology and Oil Resources of Eastern Saudi Arabia". Read by D. Milam (Aramco). Chairman: T. Pearse (I.P.C., Kirkuk).
"Preliminary Considerations of the Alborz Oil Reservoir at Qum". Talk by Dr J. Tavana (N.I.O.C.). Chairman: D. Brown (Aramco).
"Well Interference Tests in the South Dome of the Zubair Reservoir". Read by M. J. Heaton (I.P.C., Basrah).
"Difficulties in Measuring the S.P. in Highly Resistive Sands". Read by P. A. Poupon (Schlumberger).
"Analysis of Pressure Decline." Read by Dr H. Samara (I.P.C., Kirkuk).

In between the papers two films were shown at the K.O.C. Cinema. The first was a black-and-white record of the Qum well blowing wild and the strenuous work put in under the direction of Myron Kinley to cap it. This well, situated 80 miles south of Teheran, blew in with an estimated bottom hole pressure of 10,000 psi and an estimated production rate of 100,000 b.s.d. The second film was a Kodachrome record of combating the fire at Ahmadi Well No. 5, the result of sabotage action.

In the evening the Annual Dinner of the Kuwait Branch was held in the Company employees' canteen in the industrial area. This is the subject of following separate comment.

Seen during an interlude between the reading of papers were: G. Hetherington (one of the sponsors of the Symposium), M. E. Hubbard, Dr J. Tavana, and R. H. Zinszer.

Also at the Display Centre, discussing one of the papers, were Dr D. Bunyon, K. R. J. Trott, J. Beasley, R V. Browne, and A. J. Thomson.

7 February. The morning was taken up with the reading and discussion of the following paper:—

"Two Phase Flow Behaviour in Oil Well Flow Lines". Read by B. T. Yokum (Aramco). Chairman: N. Farkhan (N.I.O.C.). This paper was the result of 26,000 man-hours work.

The symposium was drawn to its conclusion by G. Hetherington (K.O.C.), who summed up the proceedings. It is of interest to note that Mr Hetherington was one of two people who conceived the idea of this technical symposium. There is thus advantage in quoting from his summing up as recorded in the *Kuwaiti* of 14 February:

"It is no disparagement to the oil men of the Persian Gulf to say that in purely technical matters they have not contributed as much to the progress of the oil industry as those in other areas. Whilst the latter were developing the science of oil production we were producing oil. The vastness of the oil reserves of this area and the relatively slow rate at which they have up till now been drawn upon, have made it unnecessary either to appraise critically the reserves or to give much consideration to ultimate recovery.

"Now we are entering a new era. If the forecast of oil demand presented by Mr Hubbard last Tuesday evening proves even approximately correct we too shall soon be forced to examine with increasing care the magnitude of our reserves and apply ourselves diligently to achieving the maximum recovery possible. We shall have much to learn from one another and it is in such meetings as this, and the others which I trust will follow, that we shall increase our knowledge."

Finally, L. T. Jordan, K.O.C. general manager, closed the symposium by expressing his appreciation at seeing so many technical men from neighbouring areas gathered together in Kuwait.

The following papers and notes were also made available to delegates during the symposium.

"Temperature Notes on the Bahrain Field"—W. H. Cotter (Bapco).
"Determination of the Temperature Co-efficient of a Ni Span C Amerada"—P. D. O'Connell (Qatar).
"Density of Reservoir Crude with relation to the Calculation of Bottom Hole Pressures"—D. Bunyon (I.P.C.).
"Some Operating Difficulties experienced with Ruska Sub-Surface Samplers"—P. D. O'Connell (Qatar).
"A Simple Method for the Measurement of the Salt Content of Crude Oil"—P. Branson (Qatar).
"Results of Drill Stem Tests"—P. D. O'Connell (Qatar).
"Example of Interpretation of Radioactivity and Resistivity Logs in a Shaly Sand"—P. A. Poupon (Schlumberger).

The Companies represented at the symposium were Kuwait Oil Co Ltd, American Independent Oil Co, Arabian American Oil Co, Bahrain Petroleum Co Ltd, Basrah Petroleum Co Ltd, British Petroleum Co Ltd, The Consortium, Iraq Petroleum Co, Lobitos Oilfields Ltd, Mosul Petroleum Co Ltd, National Iranian Oil Co, Qatar Petroleum Co Ltd, Rendell, Palmer & Tritton, E. W. Saybolt & Co, Schlumberger Overseas S.A.

The hard-worked and energetic secretary of the Symposium, R. J. L. Stephens at the Display Centre with R. Milne, J. L. Hopkinson, and T. C. Pearse.

The Branch's Fifth Annual Dinner

The 1956/57 Annual Dinner scheduled for the 28 November 1956 was postponed because of prevailing circumstances until the 6 February 1957. This postponement served a useful purpose in that it enabled all the delegates to the technical symposium to participate.

Located initially in the guest house, the revised attendance of 150 made larger accommodation desirable and use was made of the Company employees' canteen in the industrial area. As this new canteen furnishes daily 750 to 800 lunches to employees, its ability to cope with the number was beyond doubt. Through the underlying efficient organization which one now accepts as normal, the amenities and service were equivalent to any available to the parent body.

To those conversant with the local fare, outside that of the oil companies, the menu may be of interest: Smoked Scotch Salmon, Clear Beef Consommé, Vol-au-vent of Lobster, Roast Surrey Capon, York Ham, Assorted Cheese Plate.

The Guest of Honour was G. W. Bell, C.B.E., Her Majesty's Political Agent in Kuwait.

One has to adjust oneself to the fact that in the Middle East the week-end is Thursday and Friday and not Saturday

At the Dinner, A. C. Hartley, C.B.E., replied to the toast of the Institute. Seated (left) *are Garvain Bell, C.B.E., and R. K. Blackwood, M.B.E., and* (right) *E. Boaden, O.B.E.*

A group at the Dinner: H. Brewer (U.S. Consul, Kuwait); Garvain Bell, C.B.E., A. Scheffer (Consortium); and L. T. Jordan.

and Sunday. One has also to see that one's glass is fully charged for the loyal toasts. These were proposed by the chairman, R. K. Blackwood, M.B.E., to Her Majesty The Queen, to the President of the United States of America, and to His Highness the Ruler of Kuwait.

In proposing the toast of the "Oil Industry" G. W. Bell gave an informative speech with special reference to the Middle East, and L. T. Jordan, general manager of the Kuwait Oil Company, replied with a few well-chosen words.

The toast of the Institute was proposed by C. R. Birdwood, acting chief engineer, Public Works Dept., Kuwait, and replied to by A. C. Hartley, C.B.E., a vice-president of the Institute of Petroleum. He conveyed to the meeting greetings from Lord Geddes, president of the Insitiute.

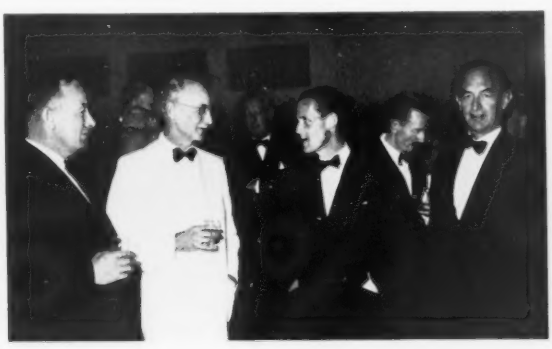
Lastly the chairman, R. K. Blackwood, M.B.E., dealt with the toast of "The Guests" in freer style, which was matched by the reply given by M. E. Hubbard, Member of Council of the Institute.

And so a memorable evening drew to its close, an evening which will remain as a pleasant memory to the wide range of technologists who participated in it.

Also at the Dinner, A. C. Hartley, C.B.E. (right) *talks to A. Scrutton and R. A. Lambourn* (left).

At one of the tables at the Dinner were W. H. Cotter, J. M. Dougary, and R. Campourcy.

Another group at the Dinner: R. K. Blackwood, M.B.E., (President, IP Kuwait Branch), M. E. Hubbard, Garvain Bell, C.B.E. (H.B.M. Political Agent in Kuwait), and E. A. V. de Candole, C.M.G., C.B.E. (K.O.C.).



Around the Branches

BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD

Bahrain Branch

A meeting of the Branch was held in the Awali Hall on 3 December, when the past chairman, W. H. Cotter, introduced the present chairman, G. B. Thompson, who presented a paper entitled "Oil and the Suez Canal".

Mr Thompson traced the building and development of the Canal up to the present day and indicated how vitally Middle East oil was linked to the Canal in that prior to the recent stoppage approximately 62 per cent of the total traffic was tanker traffic. His talk, which was well illustrated with recent photographs of the Canal and Port Said, stimulated an interesting question and discussion period in which many members took part.

H. G. Babbage proposed a vote of thanks to Mr Thompson for his very timely talk.

Fawley Branch

The Annual General Meeting of the Branch was held at the Esso (Fawley) Recreation Club, Holbury, on 1 February, when the following committee was elected: Chairman, Dr F. Mayo; vice-chairman, N. B. Smethurst; hon. secretary, S. A. Berridge; hon. treasurer, Dr D. F. Jacques; hon. social secretary, V. Czura; hon. publication secretary, F. L. Brooks; hon. meetings secretary, J. R. Baddiley.

Following the completion of the business of the A.G.M., a lecture entitled "Farnborough 1956 and Motor Powerboats" was given by R. DuCane, who illustrated his talk with over 100 colour slides taken by himself.

Dealing with Farnborough first, he said that the dreadful weather experienced during the whole week of the display made the colour photography of high-speed aircraft very difficult. He had, however, managed to produce several vivid pictures of fighters flying near or above sonic speeds, and he pointed out several of the salient design features of these and other aircraft at the Display.

In regard to motor powerboats, Mr DuCane first explained the technique for obtaining a successful photograph of a vessel approaching at high speed. He then showed a series of slides of coastal minesweepers, air-sea rescue craft, and sundry other vessels.

During the discussion which followed, he answered a number of questions both on the techniques and problems of taking photographs in colour and also on the subject matter itself.

London Branch Dinner Debate

Nearly one hundred members and friends of the London Branch gathered around the bar of the Chatham Rooms, Victoria Station, in the early evening of 23 January. They were all eager for the fray, for the occasion was the Branch annual dinner debate. After an excellent and informal dinner, the bar was again well patronized while decks were cleared for action and the room arranged for debate.

The motion before the meeting was "That this house regrets the passing of the private motorist" and, after chairman R. F. Leach had introduced the principal speakers, R. J. Edwards of the *Evening Standard* set the ball rolling.

He first recalled the recent series of articles in the Press which dealt with travelling into London by inadequate public transport. Such conditions, he said, were obviously a spur to the private motorist. Moreover the authorities welcomed the private motorist because of the high taxes he paid (which were not used to improve the roads), providing the car stayed in its garage and did not occupy road or parking space. That the motor car gave the greatest pleasure to a large number of persons was proved by its survival in spite of the high taxation made even higher by the reduced mileage possible under the rationing scheme. The car, he said, should be used to enable persons to enjoy the countryside, the beauty of which should not be allowed to become spoiled by indiscriminate building. Finally, he supported taxation on all road users—even pedestrians.

J. S. Dean, a vice president of the Pedestrians' Association replied that he felt the P.A. was a better organization for the motorist to support since its motto was "Safe roads for all". He referred to the A.A.'s plebiscite in 1934 on the speed limit when the majority of its members was in favour of the limit, but this did not alter the A.A.'s policy to fight all speed limits.

G. W. Allison (Touring Publicity Office, A.A.) in seconding the motion, said that he was not originally certain whether the term "passing" meant the "going by" or the demise of the private motorist. The A.A., he said, had for years carried out the battle for the private motorist in the motoring press and in reply to Mr Dean insisted that the A.A. had always supported "safety on the roads". Public transport was inadequate and rationing of fuel was only helping to increase the revenue of an inefficient service. He especially mentioned inadequate or non-existent late services and cited the case of attempting to cross London late at night. Here, he said, the motor car gave the greatest independence of movement notwithstanding the heavy taxation. Dollar earning hotels were in danger of failing from lack of home users' support due to fuel rationing. Parking meters would reduce parking space in the streets since a greater length of kerb was required per vehicle and he

visualized a shortage of shillings—not for the gas but for the parking meter (laughter).

Dr L. Dudley Stamp, C.B.E. (Council for the Preservation of Rural England) said that he was under the impression he was to speak for the motion, but was now aware of his error, which was not important since he had not made any notes (laughter). According to Malthus' prophecy on the earth's population, he said that by 2579, cars would not have room to move off the production lines and that by 3576 each person would have only one square yard of space. His main objection to cars was that while their owners were enjoying the countryside, the cars were dripping oil on the grass where they stood, and suggested that a lubricating oil suitable for use as a fertilizer should be developed. In the course of many humorous remarks a comparison was made between a dinosaur, with its large bulk and tiny brain, and a modern car with its (comparatively) small driver, which with all its 250 h.p. could often only make the speed of the original vehicle, the 1-h.p. horse.

A large number of contributions were made from the floor when the discussion was thrown open. Among those who spoke were Mrs W. H. Davies, A. J. Goodfellow, J. C. Jukes, W. J. Nolan, J. H. M. Clark for the motion and Messrs Hills, Farrant, Evans, and W.H. Davies against.

All good things come to an end and when R. F. Leach, who should especially be mentioned for his excellent handling of the meeting and witty remarks when introducing the speakers, and for keeping them lubricated during the dry business of talking, asked for a show of hands, it was discovered that the motion had been carried, but the chairman was heard to remark—"It was a close thing."

Scottish Branch

A joint meeting of the Branch and the Scottish Section of the Institute of Fuel was held in the North British Hotel, Edinburgh, on 21 February, when J. G. Annan, B.Sc., production superintendent at BP Refinery (Grangemouth) Ltd, presented a paper on "Modern Petroleum Refinery Operation".

In introducing the speaker, J. A. Brown, chairman, said that Mr Annan had spent most of his career at Grangemouth refinery, and was well qualified to speak on the operation of a modern petroleum refinery.

Mr Annan first referred to the rapid post-war expansion in petroleum production in order to supply the fuels required to sustain the increasing world energy demands, and also to provide the base stocks for a rapidly developing chemical industry based on petroleum products.

He then drew attention to the major expansion of petroleum refinery facilities in the U.K. during the same period, which, he said, followed a policy of locating new refineries in close proximity to main consuming areas instead of in the producing regions.

Concurrently with this expansion, he said it was important to note the progress made by the petroleum equipment manufacturers of the U.K. in providing a large proportion of the refinery equipment.

After a brief description of the nature of the raw material, he went on to discuss some of the modern processes whereby the crude oil was converted into a range of products which would satisfy the exacting requirements of present-day needs.

This description was illustrated by simple flow diagrams of crude oil distillation units, and chemical treatment processes such as the copper chloride process and the liquid sulphur dioxide process for removing impurities from the distillates.

He then gave an account of the operation of modern catalytic cracking and reforming processes designed to convert low quality products from the crude oil into high octane motor fuels, and the catalytic polymerization process for likewise converting the light olefinic gases from the cracking process into similar fuels.

Finally, he described the blending procedures whereby the products are worked up into the various finished motor spirit, diesel oil, and fuel oil grades required by the market.

South Wales Branch

A meeting was held at the Training Centre, BP Refinery (Llandarcy) Ltd, on 10 January, when Dr R. R. Gordon, assistant director of research, National Coal Board, gave a lecture entitled "Coal and Oil as Partners in Energy Supply".

Dr Gordon first explained that coal and oil were partners in providing the greater part of the world's energy requirements and should be viewed against the developments in (1) atomic energy; (2) future processing of coal, and (3) the supplementing of petroleum by oil from coal.

Continuing, he said that, apart from the supply of energy, there were the developments in petroleum chemicals, *e.g.* the production of styrene from benzene derived from coal or from ethylene derived from petroleum, and the replacement in some instances of coal derivatives by petroleum chemicals.

Dr Gordon then referred to the production problems of the coal industry with its many old collieries, the receding face of the coal, the past prodigal use and production of the coal, and the diminished labour force. These, he said, were being actively met by reconstruction and mechanization of the older pits and the sinking of new pits designed to win the coal more efficiently from selected coalfields.

He also said that research and development, neglected in the past, were now being actively pursued. Moreover, modern processes were being introduced, such as the employment of fluidized beds for carbonization, and a lot of work was going into the development of smokeless fuels.

A very lively and even critical question time followed the talk and this was ably dealt with by the lecturer.

Finally, Dr Gordon was accorded a vote of thanks, proposed by E. B. Johnson, Institute of Fuel.

Trinidad Branch

The Annual General Meeting was held at Apex Club, Trinidad, on 1 February when, in addition to the principal business of the evening, several oil industry films were shown. Some interest attaches to the fact that the past year saw the introduction of local, non-corporate membership, and 32 new members took advantage of these arrangements, which should prove especially attractive to those permanently resident in Trinidad.

In reporting the previous year's activities the hon. secretary, J. L. Deal, mentioned the full and varied programme of papers which had been presented and had, on the whole, been well attended. The retiring chairman of the Committee, J. A. Hulme, was accorded a hearty vote of thanks in appreciation of his services to the Branch during the past year.

The ballot for a new committee resulted in the election of Dr A. L. Down (The Trinidad Oil Co Ltd, Pointe-à-Pierre), P. Bushe (Trinidad Petroleum Development Co Ltd, Palo Seco), and G. Hillier (non-corporate representative—Apex (Trinidad) Oilfields Ltd, Fyzabad). Retirements from the Committee were J. A. Hulme (The Trinidad Oil Co Ltd, Pointe-à-Pierre) and A. N. Holmes (Shell Trinidad Ltd, Point Fortin), leaving H. Costello (Apex (Trinidad) Oilfields Ltd, Fyzabad), M. W. Godfrey (Shell Trinidad Ltd, Point Fortin), J. L. Deal (The Trinidad Oil Co Ltd, Pointe-à-Pierre), and Dr K. W. Barr (The Trinidad Oil Co Ltd, Pointe-à-Pierre) continuing in office. Subsequently, the Committee elected H. C. Costello as chairman for the current year, G. Hillier taking over the position of hon. secretary. A programme of meetings for the coming year is in preparation.

* * *

CRUDE OIL PRODUCTION

	January Tons
Iraq Petroleum Co Ltd	104,768
Basrah Petroleum Co Ltd	802,788
Mosul Petroleum Co Ltd*	8
Qatar Petroleum Co Ltd	498,700
Kuwait Oil Co Ltd	3,809,476
Iraanse Aardolie Exploratie en Productie Mij ...	2,682,000
The British Petroleum Co Ltd	6,714
	Brl
Kern Oil Co Ltd	
California	113,880
Trinidad	88,580

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for January was 1,414,000 tons.

*The small amount produced by the Mosul Petroleum Co Ltd, was used for local purposes. Kirkuk continued to supply crude oil to the Iraq Government oil refinery near Baghdad.

THE EASTLAKE MEDAL

The Council of the Institute has decided that the next award of the Eastlake Medal shall be to Dr E. B. Evans, a vice-president of the Institute. its honorary editor, and Chairman of the Publications Committee. He also serves on several other committees. The presentation will be made in October and details will be announced in due course.

* * *

THE PIPELINE INDUSTRIES GUILD

The Pipeline Industries Guild, as it is now called, held its inaugural meeting in London on 24 January.

The objects of the Guild are: to promote, foster, and develop the science and practice of pipeline design, construction, operation, and ancillary processes and techniques; to enable all persons engaged in pipeline construction, operation, and allied industries to meet and to correspond; to exchange technical ideas; to promote research and development upon pertinent subjects, and to join other bodies in doing so; to organize conferences and functions; and to establish, administer, and contribute to educational, charitable, etc. funds. Membership is divided into two classes: individuals; and corporate members such as companies and other bodies.

The following officers and members of committee were elected on a show of hands: J. W. Jones (chairman); C. C. Bates (hon secretary); T. W. Jones (hon treasurer); S. J. Manning, G. McHardy, R. J. Wright, and D. J. Green (ordinary members); and J. W. Esmonde and K. A. Spencer (nominees of corporate members).

The chairman announced that W. H. G. Roach, who had provisionally agreed to serve as president, had reluctantly asked to be released by reason of business demands upon his time. The choice of a new president was left for later consideration.

Forms of application for membership are available from the Secretary, at 7 Iddesleigh House, Caxton Street, London, S.W.1. A short brochure describing the constitution and aims of the Guild is being prepared.

* * *

ASTM MEETINGS

Meetings of the ASTM scheduled for the 1957–61 period are:—

1957	June 16-21	Annual Meeting	Atlantic City, N.J.
	Oct. 6-10	Committee D-2	Washington, D.C.
1958	Feb. 10-14	Committee Week	St. Louis, Mo.
	June 22-28	Annual Meeting and Exhibit	Boston, Mass.
1959	Feb. 2-6	Committee Week	Pittsburg, Pa.
	June 21-26	Annual Meeting	Atlantic City, N.J.
1960	Feb. 1-5	Committee Week	Chicago, Ill.
	June 26-July 1	Annual Meeting and Exhibit	Atlantic City, N.J.
1961	Jan. 30-Feb. 3	Committee Week	Cincinnati, Ohio.
	June 25-30	Annual Meeting	Atlantic City, N.J.

Personal Notes

W. R. Edwards, M.I.Mech.E., has retired from the position of managing director of John Thompson Water Tube Boilers Ltd, after over 50 years of service with the John Thompson Group. For the time being, Mr Edwards is continuing with the Group in a consultative capacity. He is succeeded by **C. J. Howard,** who has been with the Company for 31 years, the last 20 years of which have been spent as London manager and director.

C. J. Howard

H. Winning, B.Sc., D.R.T.C., A.F.Inst.Pet., general manager of the Glass Laminate Division of Tenaplas Ltd and technical manager of the Company, has recently resigned these positions and is to engage in consulting work in the engineering plastics field as Herbert Winning and Associates. His address will be 39 Brightwalton, Newbury, Berks.

J. P. Ford, M.A., M.Inst.Pet., A.M.I.E.E., has been appointed to the Board of Associated British Engineering Ltd as an executive director.

In view of the important public duties he will assume in the near future as chairman of London County Council, **R. McKinnon Wood**, O.B.E., has asked to be relieved of his duties as chairman of Griffin and George Ltd. He will remain on the board and **K. G. Sinclair** has been appointed chairman. **N. McKinnon Wood** has been appointed vice-chairman, and **N. Trepte** has been appointed managing director in his place.

E. F. Choppen

E. F. Choppen, M.Inst.Pet., has been appointed manager of Esso's Co-ordination and Economics Department and chairman of the Company's Co-ordination Committee. He succeeds **D. A. C. Dewdney** who, as announced in our February issue, has been appointed a director of the Company. Mr Choppen was appointed assistant general sales manager at Head Office in 1953 and, after attending the Advanced Management Programme at Harvard University in 1955, spent a year in New York on a special assignment with the Standard Oil Company (New Jersey), maintaining contact with the marketing operations of the Esso companies in Scandinavia and the Benelux countries. He returned to London early this year.

John Stuart has recently been appointed sales director on the board of M. & C. Switchgear Ltd, of Glasgow. For the past five years he has been sales manager and has graduated to his present position through the various departments of the Company. It is also announced that **G. K. Talbot,** B.Sc., is the new chairman in succession to **Dr J. B. Mavor,** who retired recently.

John Stuart

S. A. Gregory, B.Sc., M.I. Chem.E., A.M.Inst.Pet., formerly chief of Frodingham Research Dept., Appleby-Frodingham Steel Co, has been appointed technical manager of Audley Engineering Co Ltd.

★ ★ ★

NEW DIRECTORS FOR BP GROUP

The British Petroleum Company Ltd has announced the following appointments:—

R. B. Dummett, managing director of The Commonwealth Oil Refineries Ltd, BP's marketing organization in Australia, has been appointed a director of The British Petroleum Co Ltd to fill the vacancy caused by the resignation of **B. R. Jackson,** announced in last month's issue.

R. B. Dummett

D. Anderson, A. E. C. Drake, C.B.E., M.A., A.C.A., M. Inst.Pet., and **C. E. Spearing,** F.Inst.Pet. have been appointed directors of BP Trading Ltd, BP's principal trading subsidiary.

Mr Anderson, chief accountant of BP, joined the Company's Head Office in 1920. He has played an important part in all major discussions and negotiations involving the Company's financial and economic affairs.

Mr Drake, joined the Anglo-Iranian Oil Co (now BP) in 1935. After serving in the Accounts Department in London, he was transferred in 1938 to Iran where he held a number of accountancy posts. In 1944, he became commercial superintendent in the General Refineries Organization. Later, he acted as commercial manager, and subsequently manager in Baghdad.

During 1948 and 1949 he successfully conducted important negotiations with the Syrian Government on behalf of Middle East Pipelines Ltd. In 1951 he was appointed general manager in Iran and Iraq. On his return to the U.K., he occupied a number of senior posts at BP's Head Office, becoming manager in 1956.

Mr Spearing joined the Anglo-Persian Oil Company (now BP) in 1921. In 1922, he transferred to the Company's Head Office as assistant manager of the Refineries Department, becoming general manager in 1943.

D. Anderson

A. E. C. Drake

C. E. Spearing

P. T. Cox, M.Inst.Pet., who has been general manager (exploration) since April 1926, has been appointed managing director of BP Exploration Co Ltd.

★ ★ ★

Petroleum in Parliament

West Indies Oil Exploration

In a written reply on 6 February, the Secretary of State for the Colonies said that the British Colonial Governments in the Caribbean area have granted numerous exploration and prospecting licences. In the Bahamas and Jamaica, off-shore possibilities were being investigated, and in Trinidad off-shore drilling was in progress.

On 15 February he gave the names of the companies licensed to search for oil in the Caribbean area as:—

Bahamas
- Bahamas Exploration Co Ltd
- Bahamas National Oil Co Ltd
- Bahama California Oil Co Ltd
- Sun Production Co of Bahamas Ltd

Barbados
- Caribbean Gulf Oil Co

British Honduras
- British Honduras Gulf Oil Co

Jamaica
- Jamaica Stanolind Oil Co Ltd

Trinidad
- Trinidad Northern Areas Ltd
- Trinidad Petroleum Development Co Ltd
- Dominion Oil Ltd
- Antilles Petroleum Co Ltd
- Kern Trinidad Oilfields Ltd
- Apex Trinidad Oilfields Ltd
- Premier Consolidated Oilfields Ltd
- Siparia Trinidad Oilfields Ltd
- Trinidad Central Oilfields Ltd
- The Trinidad Oil Co Ltd
- Shell Trinidad Ltd

Turks and Caicos Islands
- Bahama California Oil Co Ltd

U.K. Crude Oil Imports

In a written reply on 4 February, the Parliamentary Secretary to the Ministry of Power said that 822 million gallons of crude oil and 52 million gallons of refined products were imported into the United Kingdom from Persia during 1956. The refined products were as follows:—

	Million gallons
Motor Spirit	33
Gas/diesel	9
Kerosine	5
Fuel oil	5

Oil Surveys

In a written reply on 11 February, the Paymaster-General said that survey parties in search of oil and natural gas are at work in the North Midlands, Yorkshire, and Lancashire and test wells are being drilled or will shortly be started in these areas. Small-scale surveys, he said, were recently made off-shore in the Robin Hood's Bay, Weymouth Bay, and Isle of Purbeck areas.

Shale Oil

In a written reply on 11 February, the Paymaster-General said that, in common with other producers of indigenous oil, the shale oil industry was already encouraged by a duty advantage of 1*s* 3*d* a gallon as compared with the duty on imported oils. He also said that he understood that in the United States the Government had ceased contributing to the development of shale oil and there was virtually no commercial production. Finally, he said he had no information about the economics of shale oil production in China but he understood that the output was relatively small.

Petrol Stocks

In a written reply on 11 February, the Paymaster-General said that thanks to the savings effected by rationing, and by the co-operation of all classes of consumer, stocks of petrol were then only a little below the level of a year ago. The major difference in the situation was, of course, that over the next few months supplies were unlikely to amount to more than between 70 and 80 per cent of normal consumption.

Diesel Oil Consumption

On 13 February, the Minister of Transport and Civil Aviation said that the British Transport Commission estimated that British Railways' total consumption of diesel oil for motive purposes in the first 16 weeks of 1957 would be approximately 11,320 tons (compared with 7755 tons in the same period of 1956). This represented a considerable saving on the consumption required to carry out the programme as originally planned.

Middle East Pipeline Discussions

In a written reply on 27 February, the Secretary of State for the Home Department and Lord Privy Seal said that discussions had taken place between the Iraq Petroleum Company and interested Governments about the possibility of a pipeline from the oilfields of Northern Iraq through Turkish territory to the Mediterranean seaboard, and arrangements had been made for Her Majesty's Government to be kept informed as to their progress.

Notes of the Month

Fifth World Petroleum Congress

The Coliseum, New York, where the Fifth World Petroleum Congress will meet during 30 *May to* 6 *June* 1959.

Regent's New Bristol Office

The Regent Oil Company announces that its Western Branch Office has moved to the recently completed Prudential Assurance Company building in Wine Street, Bristol.

Oil Industries Club

The new address of the Oil Industries Club is Room 4, Caxton House East, Westminster, London, S.W.1. Telephone number is WHItehall 1010, extension 39.

X-Ray Diffraction Data

By an arrangement with the Institute of Physics and the ASTM, made some time ago, X-ray diffraction data published by the ASTM can be obtained in the U.K. Those interested should communicate with Dr R. L. Gordon, acting hon. secretary X-ray Analysis Group, Institute of Physics, Safety in Mines Research Establishment, Portobello Street, Sheffield 1.

Record Visits to Stanlow and Shell Haven

New records for visitors to two of Shell's four U.K. refineries were created in 1956, when a total of approximately 11,500 people were handled at Stanlow and Shell Haven. At Stanlow, the year's total of 6000 included nearly 1000 overseas visitors from 74 countries. One of the largest single groups, exceeding 1000 in number, was from universities and schools.

Guatemala Oil Search

Early in February, a Shoran-guided airborne magnetometer survey of 40,000 sq. km. of Northern Guatemala was started by the Aero Service Corporation of Philadelphia on behalf of a group of 15 oil companies who have underwritten the survey. Cost will be about half a million dollars and it is expected that Shoran and magnetometer data will be completed by October.

New Ethylene and Ethanol Plants

British Hydrocarbon Chemicals Ltd announces that its two new plants for the production of ethylene and ethanol have been successfully brought into commercial operation, and have doubled the existing capacity for these basic chemicals.

The decision to construct the two plants was announced in June 1955, as part of an £8 million expansion programme of the Company's chemical works at Grangemouth.

BP Fuels for Snowy Mountain Schemes

Diesel fuel and power and lighting kerosine are being supplied to the Snowy Mountains Hydro-Electric Authority by BP's Australian marketing associate, The Commonwealth Oil Refineries Ltd. The objectives of the £400 million Snowy Mountain Scheme are to divert the waters of the Snowy River westward through the Great Dividing Range to irrigate the inland plains and to harness the 2000-ft fall of water for the generation of electricity.

Underground Electrical Cable Protection

The Oil Companies Materials Committee has just issued its Specification No. Elec. 4, Underground Lead Covered and Armoured Cables Protected Against Corrosive Attack. It is considered that considerably improved protection of such cables against soil corrosion can be provided economically by PVC coverings. Two specifications are given and it is hoped that experience in use will ultimately result in one specification for the oil industry.

Air Transport for Drilling Equipment

Small helicopters have been used for several years for geophysical work in Papua, New Guinea, where BP is searching for oil in association with Australian and American interests. Recently, however, much larger machines, two new S.58 Sikorskys, began an entirely different operation—the transportation of a drilling rig and equipment to the location of a new well at Komewu.

This "helirig" operation is the first of its kind carried out in Papua and will obviate the building of roads to the drilling site—a great advantage in a country which has up to 350 inches of rain a year and where it may take up to two months to build a mile of road.

Transporting drilling equipment by helicopter for use by The Australasian Petroleum Company in the Papuan jungle. Two National Type 50 *rigs have been sectionalized into loads not exceeding* 4000 *lb.*

New Passenger Vessels

The first of three fast passenger vessels built for Cia Shell de Venezuela for use on Lake Maracaibo to transport staff and equipment to drilling rigs on the lake. Powered with two Napier Deltic *engines, speeds of over* 31 *knots* (36 *m.p.h.*) *can be attained. Builders were John I. Thornycroft & Co Ltd.*

BP in Canada

BP (Canada) Ltd—a subsidiary of The British Petroleum Company Ltd—has announced the acquisition of a 600-acre site near Montreal on which the Company plans to build a refinery, which will process imported crude oil and manufacture high-grade petroleum products for the Canadian market.

These plans represent the first venture of the international BP Group into marketing and refining in North America.

While no final decision has yet been taken on processing details, it is expected that the refinery, when fully commissioned, will have a capacity of the order of 30,000 barrels per day, which may be reached in more than one stage.

The Company also plans to begin marketing petroleum products in Canada under the BP trademark within the next year.

It will be recalled that in December 1953, The British Petroleum Company acquired a considerable interest in the Triad Oil Co of Calgary, Alberta Ltd. This interest is now being increased to 50 per cent. Triad is actively engaged in oil exploration in Western Canada and now has a substantial interest in 6 million acres in Alberta, British Columbia, Saskatchewan, and Manitoba.

Oil in the Home

For the first time a major oil company exhibited at the recent *Daily Mail* Ideal Home Exhibition. The company, Shell-Mex and BP Ltd, had a huge stand divided into six sections representing a lounge, kitchen, bedroom, bathroom, garage, and garden shed.

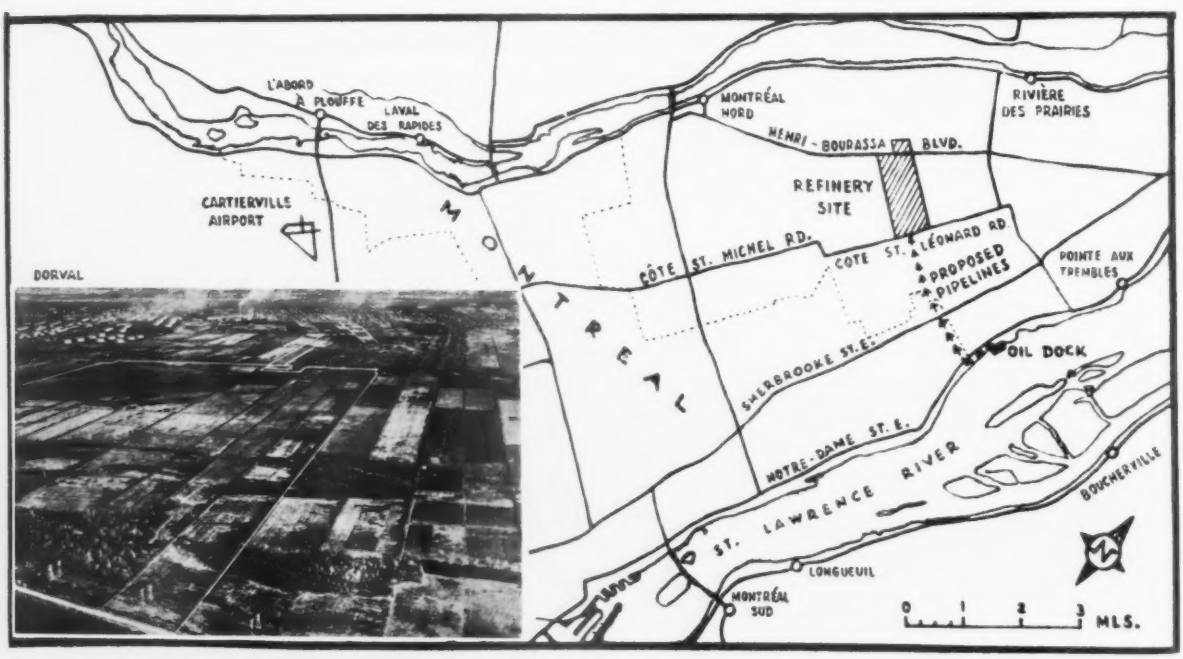
In these rooms, outsize plaster shapes symbolized articles which owe something in their origin to oil. In the kitchen, for example, much of the new plastic equipment was shown.

Oil Supplies for Europe

Socony Mobil Oil Co Inc, announced that during January its refineries at Beaumont and East St Louis cut back crude runs by 17,500 b.d., releasing that amount of crude for shipment to Europe. The refineries at Beaumont, Augusta, and Paulsboro were making 1,750,000 b.d. over normal production of heavy fuel oil during December to March for export to Europe.

All Mobil refineries in Europe had adjusted operations to yield maximum quantities of most-needed products.

Shipments of crude oil and products by The Texas Company to Europe during the five months to 31 March will



Location at Ville d'Anjou of the oil refinery to be built by BP (Canada) Ltd, a subsidiary of The British Petroleum Co. Ltd. It is at the eastern end of Montreal Island and about 3 *miles north of the St. Lawrence River.*

A 32,000 Tonner on Trial

The BP tanker British Industry, *a 32,000-tonner, seen during her recent trials off the Isle of Arran prior to her maiden voyage to the Persian Gulf via the Cape.*

total 18·5 million barrels compared with normal contractural commitments of 6·4 million barrels. This was stated by A. N. Lilley, a vice-president of the Company to a U.S. Senate sub-committee on 21 February.

Safety Training Courses

The Birmingham and District Industrial Safety Group is arranging a series of safety courses for employees of industrial undertakings at home and abroad. Following are the details:—

Foremen, Supervisors, etc. This course is of a general nature, dealing with all aspects of industrial safety. Ample opportunity will be given for those attending to have their own specific problems discussed, and to make suggestions. The course will be held on 2–3 July, 1–2 October, and 3–4 December. The fee is £3 10s. per person.

Industrial Truck, Fork Lift Truck, and other Drivers. This is essentially a practical course, using the latest materials-handling equipment, loaned by various manufacturers. It will be held on 9–10 April, 28–29 May, 9–10 July, 3–4 September, and 29–30 October. The fee is £3 10s. per person.

Part-time Safety Officers. This intensive one-day course for executives, foremen, and others whose duties include the oversight of accident prevention in their works is especially suitable for officials from small and medium-sized works. It will be held on 22 May, 26 September, and 11 December. The fee is £2 2s. per person.

Chemical Workers. This two-day course is designed for the supervisory grades in the chemical industry. It includes a review of accident prevention in industry generally with the particular hazards of the chemical industry dealt with by specialists. The course will be held on 5–6 November and the fee is £3 10s. per person.

Further details of the above and other safety courses may be obtained from the B.D.I.S. Group, The Industrial Safety Training Centre, 22 Summer Road, Acocks Green, Birmingham 27.

New Watergas Process for Shell Haven

A new process for conversion of oil under pressure into watergas will be used at the £6 million plant now under construction at Shell Haven, in Essex, for the manufacture of nitric acid and ammonia which is to form the basis for large-scale production of agricultural fertilizers. Until now, such gas has been produced in Europe mainly from coke and coal. Completion is expected by the autumn of 1958 and the planned capacity is for 200 tons oil intake per day.

Other uses of the process are in the steel industry and for the manufacture of town gas.

Evolved by N. V. De Bataafsche Petroleum Maatschappij, one of the main operating companies of the Royal Dutch/Shell Group, the new process can use any hydrocarbon ranging from gas to heavy fuel oil as base material and offers an economically attractive and flexible new technique. The first commercial unit in Europe is already operating successfully at Ijmuiden, near Haarlem, in the Netherlands.

New-Type Mobile Platform for Overhead Working

The first mobile platform for overhead working to be ordered by Shell was shipped recently to Compania Shell de Venezuela for their Cardon refinery. Mounted on a 3-ton chassis, the platform can be extended at a speed of over 40 ft a minute to any desired working position within a maximum height of 40 ft and a reach of 25 ft. It is electrically insulated up to 500 V and will be used for maintenance of overhead electrical installations and refinery units.

The Simon Hydraulic Platform in the folded position (above) *and extended* (left).

Known as a Simon Hydraulic Platform and made by Simon Engineering (Midlands) Ltd, of Dudley, Worcestershire, the machine consists of a turnable base, with two booms linked above it which may be "folded" or opened by the operation of hydraulic rams. The platform itself is either controlled by the operator working on it, or from the ground. Total cost of this combination is £3280.

Special features of the model for Cardon are its 5-man cab and extra large tool-box capacity. The platform itself will carry a 750-lb load, *i.e.*, one or two men depending upon the weight of the tools they are using.

Increased U.K. Oil Production

The January production figure of 6714 tons from BP's oilfields in Britain was the highest for any month since the end of the second world war. This increase is mainly due to increased production from the Egmanton field, which was discovered in 1955.

On the exploration side, BP and two of its contractors have seismic reflection parties working in England at the present time. The areas they are covering are at Ellenthorpe, Yorkshire; Widmerpool, Leicestershire; and an area between Retford and Gainsborough, west of the River Trent.

★ ★ ★

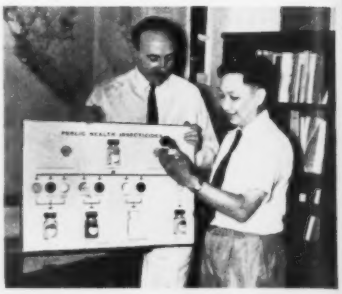
BRITISH ENGINEERING MISSION TO CANADIAN OIL INDUSTRY

An Economic, Technical, and Goodwill Mission to the Canadian petroleum and allied industries, will arrive in Canada in May from the United Kingdom and will cross from east to west, visiting all important oil installations and companies in the Dominion. The main object of the Mission is to examine all means of promoting and increasing sales of British manufactured engineering products to these vast and growing industries. Canada, with a developing and prosperous engineering industry, is a discriminating market. It is felt, however, and rightly so, that the virile British petroleum equipment Industry has much to offer to the Canadian oil industry. The Mission, sponsored by the Council of British Manufacturers of Petroleum Equipment, is being led by J. M. Storey, managing director, Dewrance and Co Ltd, G. L. Hancock, Director, David Brown Industries Ltd, is deputy leader and the remainder of the Mission, which is limited to a total of twelve, is made up of the following companies: British Thomson-Houston Export Co Ltd, Coventry Gauge and Tool Co Ltd, I.V. Pressure Controllers Ltd, Imperial Chemical Industries Ltd, Metropolitan-Vickers Electrical Export Co Ltd, F. Perkins Ltd, Petbow Ltd, Steel Equipment Co Ltd, Winn and Coales Ltd, and Yorkshire Copper Works Ltd.

J. M. Storey

The Mission will be in Canada for approximately three weeks and on its return will issue a comprehensive report of its journey.

Vector Control Instruction



Dr. W. K. Ng, Rural Health Officer for Singapore, and D. P. G. Butler, chemical Department of The Shell Company of Singapore, examining a bottle of dieldrin taken from a portable display cabinet used for vector control instruction. The cabinet has been presented to the Entomological Section of the Singapore Government by the Company.

Iraq Oil Flows Again

On 6 March, the Iraq Petroleum Company announced that its chief representative in Syria had been informed by the Syrian Prime Minister that repairs to its damaged installations could commence, and the pumping of Iraq oil to the Mediterranean terminals resumed, forthwith.

The Company added that it was taking immediate steps for the resumption of its operations, and on 11 March announced that pumping of oil from Iraq across Syria had been resumed.

★ ★ ★

SUEZ SHOULD NOT CAUSE A "RETREAT" FROM OIL

Should the Suez crisis lead to a retreat from oil? asked A. W. Hardie, a Divisional Manager of Shell-Mex and BP Ltd, while speaking at the annual dinner of the Ipswich Electrical Association recently.

"I do not think so for one moment, nor do the facts suggest it," said Mr Hardie. "After all, the oil is there in the Middle East, where the British companies have done a wonderful job.

"The producing countries have got to dispose of it, and the largest markets are here in Western Europe, and above all in Britain. We and the producing countries are mutually dependent on each other.

"The breakdown in supplies from the Middle East has been due to a rupture in government-to-government relations: not to a breakdown in relations between the oil-bearing States and the oil companies.

"We in the oil industry are confident that we can overcome the present difficulties and meet the rising needs of the future, given the support and understanding of the governments concerned."

Mr Hardie said that the events of recent months had not changed fundamentally the basic issues of Britain's energy demands in the future, nor of the role that oil must play in their fulfilment.

Even if one took the peak and most optimistic estimates of coal and atomic energy production, the gap that remained was substantial, and it could be filled by oil alone.

By 1965, one could reckon that Britain's internal use of oil for energy alone would amount to around 42 million tons—practically twice what it is now.

"There is only one source from which this oil can come," said Mr Hardie, "and that is the Middle East. The only way British economy can do without extra dependence upon Middle East oil, political risks or not, is to do without most of the expansion."

The oil pier at Mina al Ahmadi. The approach road stretches 4140 feet into the open sea and carries eight 24-inch crude oil lines, a 16-inch bunker fuel oil line, and a 12-inch diesel fuel line.

The Story of Kuwait

A Record of Co-operative Achievement

Since it was first granted, in 1934, the concession to produce oil in the territory of Kuwait, the Kuwait Oil Company Ltd has developed the oil resources of the State from 797,350 tons in 1946 to 54,117,349 tons in 1956. In 1946 the number of wells connected into the gathering system was 8; in 1956 it was 211. The number of tankers loaded at Mina-al-Ahmadi during 1946 was 61, while in 1956 the total was 2603.

The story of these achievements is told in *The Story of Kuwait*, an 80-page book, profusely illustrated, and just issued by the Company. As C. A. P. Southwell, C.B.E., the managing director, says in the foreword:

Kuwatis are given full technical training at the Magwa centre.

Shipbuilding has long been a flourishing industry and Kuwait dhows are famous for sturdiness and seaworthiness.

> *"The achievements recorded in these pages have been accomplished by national and expatriate employees working together in a spirit of enthusiasm and co-operation without which these large developments would not have been possible."*

Not only is the story of the Company told but an account is also given of the history of Kuwait and of its modern development. Under the wise policy of the Ruler, Sheikh Sir Abdulla al Salim al Sabah, K.C.M.G., C.I.E., a considerable part of the large revenue derived from oil is devoted to the improvement of the country and the welfare of the people. Public works, education, and medical facilities are among the best planned and equipped in the world, while at the same time the traditional Muslim and Arab character of the community is preserved.

The toast of "The Institute of Petroleum" was proposed by Sir Bernard Burrows, Political Resident in the Persian Gulf. To his left are Lady Burrows and George Beeby Thompson.

Bahrain Branch

First Annual Dinner

The opportunities which oil technicians possess for creating good relations with the people among whom they work were referred to by Sir Bernard Burrows, Political Resident of the Persian Gulf, in a speech at Awali Hall, Bahrain, on 31 January.

Sir Bernard was speaking at the first Annual Dinner of the Bahrain Branch of the Institute of Petroleum, which was attended by about 50 people, including guests, members, and their wives.

Proposing the toast to the Institute Sir Bernard congratulated the Branch on the occasion and said he hoped it would be the first of many annual dinners to come.

Drawing a comparison between the diplomat and the technician he said it must be satisfying to the latter to know that, as a result of the oil man's labours, oil will come up from the ground to be used in some efficient manner.

Diplomats, on the other hand, have usually to work hard without seeing much visible result at the time, Sir Bernard added.

He went on to say that oil men "will almost always have a profound and general effect on the countries in which they work. Even if you work as technicians you have wider responsibilities."

Replying, George Beeby Thompson, chairman of the Bahrain Branch of the Institute, told of the branch's formation and development and paid tribute to the work of the previous chairman, R. Godfrey.

George Beeby Thompson, chairman of the Bahrain Branch, replying to the toast of "The Institute of Petroleum". (Seated, left to right), W. H. Cotter (Branch Committee member), Mrs H. G. Babbage, wife of Branch Honorary Secretary, R. E. de Mestre (Branch Committee member), Mrs C. R. Barkhurst, Sir Bernard Burrows (Political Resident), Mrs. G. Beeby Thompson, C. R. Barkhurst, acting general manager, Bahrain Petroleum Co.

The toast of "The Guests" was proposed by A. H. R. Grimsey, fields manager, Qatar Petroleum Co. (left) *and replied to by J. M. Dougary, Kuwait Oil Co.* (right). *To the left of Mr Grimsey is R. E. de Mestre, and to Mr Dougary's left are C. R. Barkhurst and Mrs P. R. A. Ensor.*

The Guests

The toast to the guests was proposed by Herbert Grimsey, fields manager, Qatar Petroleum Co. Ltd, and J. M. Dougary, of Kuwait Branch, responded.

Dancing continued after dinner until 12.30 a.m., when a successful and enjoyable evening came to an end.

The guests included Sir Bernard and Lady Burrows; C. R. Barkhurst, acting general manager, Bahrain Petroleum Co, and Mrs Barkhurst; P. R. A. Ensor, general manager, Qatar Petroleum Co, and Mrs Ensor; J. M. Dougary and J. Rae, of Kuwait Branch; and Ian Cuthbert, of BP.

★ ★ ★

Books

The British Coal Industry

For every six tons of coal produced in 1947, the coal industry now turns out seven—with no more man power. The story of this achievement has recently been published in an attractive 52-page booklet—*British Coal: the Rebirth of an Industry*.

Profusely illustrated, it covers most facets of the nationalized British coal industry in an informative and readable manner.

Petroleum Statistics

Figures of world production of crude petroleum and allied materials, together with details of output of refined products, are given in the latest volume of *Statistical Summary of the Mineral Industry* covering the six-year period 1950-55. Data regarding exports and imports of crude petroleum and its products are also given and cover the whole world. Similar information for all the important commercial minerals and metals completes what is probably the most comprehensive reference work of its type. Copies of this 369-page book, which is a publication of the Minerals Resources Division of the Colonial Geological Surveys, are obtainable from HMSO, price £1 7*s*. 6*d*. or £1 8*s*. 3*d*. by post.

The Chemical Inspectorate

Among the oldest scientific establishments in the British Government is the Chemical Inspectorate of the Ministry of Supply, founded over a century ago, in 1854. At first, it was an establishment of the War Office and located at Woolwich Arsenal. Until 1888, it was under the direction of Sir Frederick Augustus Abel, Bt., G.C.V.O., K.C.B., F.R.S., inventor of the petroleum flash-point tester which, since 1879, has been the legalized instrument for the determination of this property of petroleum products.

The story of the Chemical Inspectorate has now been told by W. G. Norris in *Chemical Service in Defence of the Realm*, the 91 pages of which make fascinating reading, particularly the first and historical chapter. Although its name has changed several times, the department's function has remained as the inspection of military stores and materials primarily by chemical means but also by such physical methods as required. To-day the Inspectorate provides a comprehensive consultative analytical service to the Ministry of Supply and many other Government departments, and its work includes the maintenance of quality standards, the preparation of specifications, and the development of new analytical techniques and apparatus. Sir Frederick Abel's original staff was an assistant and a messenger; during the second world war the staff numbered some 1600; at present it is about 700.

The ensuing ten chapters outline work which the Inspectorate has carried out on the development of various products, such as explosives, paints, plastics, textiles, and the many other materials purchased by the Ministry of Supply. One chapter is concerned with petroleum products, work on which is mainly carried out at Covent Garden, in London, and to a smaller extent at Risley, Lancashire. The Inspectorate is represented on many of the IP standardization sub-committees and panels and its research projects include development work on IP methods.

The final chapter concerns Analytical Services, a new section formed in 1955 but already working on an ambitious programme. The programme embraces polarography and electrochemistry, radiochemistry, chromatography, spectrography, and electronics among its subjects.

Copies of this booklet are obtainable from the Ministry of Supply, Chemical Inspectorate, Station Approach Buildings, Kidbrooke, London, S.E.3.

LIQUID FLOW MEASUREMENT

New Device Reduces Metering Losses

In the normal methods of measuring flow in pipelines by the use of venturi tubes or orifice plates, the flow in the main body of the fluid is seriously disturbed. Where high flows are being measured the head losses thus caused are substantial and pumping costs increase on account of the additional power needed to overcome these head losses. For example, it has been estimated that head losses caused by the introduction of an orifice plate can be from 2·5 inches w.g. at a flow of 1 million gallons day to 23 inches w.g. at 3 million gallons day. Similarly, with a venturi tube the losses are from 1 to 5 inches w.g. for such quantities.

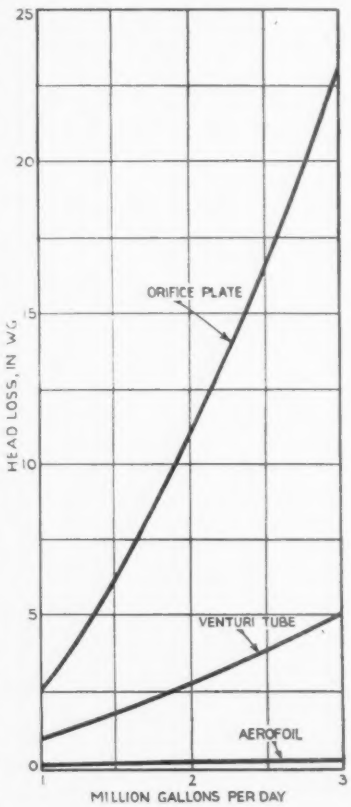


Fig 1

In order to overcome this resulting loss of fuel, an aerofoil unit has been devised and exhaustive tests have shown that by its use head losses do not exceed 0·02 inch w.g. over the whole range quoted above (see Fig 1).

As shown in Fig 2, the aerofoil unit has three alternative pressure tappings to enable the differential pressure range to be varied, those not in use being plugged. The tappings are connected to the hollow spindle, by means of which the instrument can be rotated to provide an extra means of adjusting the differential, the spindle being connected at its outer end to one side of the recording element.

A distinct advantage of the aerofoil unit is the ease with which it can be removed from the pipe for cleaning and replaced. This can be done in a few minutes through a 2-inch hole, irrespective of whether the diameter of the pipe is 2 inches or 60 inches. An average size of unit is 3-inch chord, 4-inch span, and 1½-inch thick.

The range can be 1:100 which compares with the normal range of 1:3 and in certain positions the readings all fall on the theoretical square-root law curve, *i.e.*, there is no customary deviation.

It has been used for flows with a pressure up to 960 psi and field trials have taken place with various fluids—water, steam, compressed air, town gas, producer gas, coke-oven gas, blast furnace-gas, hot gases, and petroleum products.

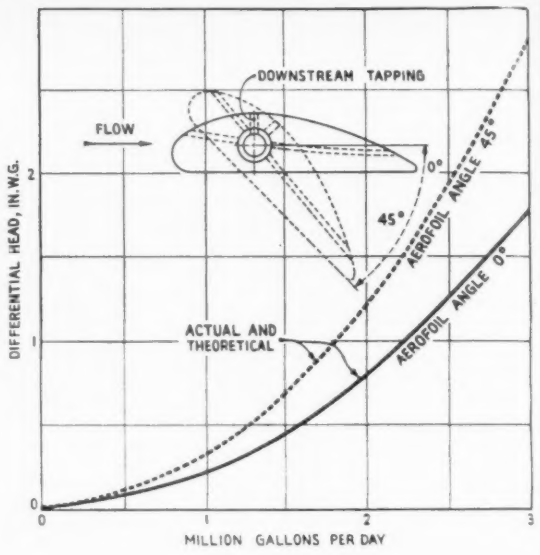


Fig 2

The unit itself can be made of any material such as steel, aluminium, titanium, Perspex, glass, quartz, or rubber. In use, it would preferably be calibrated on site, a simple operation.

The instrument is being manufactured by the Aerofoil Flow Metering Co Ltd, Cross Keys House, 56 Moorgate, London, E.C.2, of which C. E. R. Sams, F.C.G.I., M.I.Mech.E., M.Inst.Pet., is the governing director.

★ ★ ★

AIR-CONDITIONED CARAVANS

Costing £11,000, a fleet of six new-type, air-conditioned caravans—especially designed for use in a tropical climate—was shipped recently to Pakistan Shell Oil Company, to provide sleeping and working accommodation for geologists and geophysicists engaged on oil survey and exploration duties.

Air-conditioned caravan.

Suppliers of this order were the United British Caravan Company, West Drayton, Middlesex, who last year, in conjunction with Shell engineers, designed, for use in Turkey, the first folding camp trailers of their kind to be made in the U.K.

Each caravan is 16 ft long, 7 ft 6 in wide, with headroom of 6 ft 9 in, and fitted with an air-conditioning unit designed to cope with an ambient temperature of 120° F. The canopy roofs have 4 inches of air space underneath and sun awnings down both sides and at the rear. The walls, roof, and floor have 2 inches of fibreglass insulation and, to get maximum

heat deflexion, the exteriors have been left in burnished aluminium. Windows and doors are fitted with copper gauze fly screens.

The fleet consists of an office caravan fitted with drawing boards, desks, and filing cupboards; a mess caravan; a general-purpose caravan, which can be used as additional office space or rest room, and has two foldaway single beds; and three two-berth sleeping caravans, fitted with toilet facilities even to the extent of plugs for electric shavers.

★ ★ ★

KELLOGG ENLARGES ITS LONDON HOME

The Kellogg Company has had representation in the United Kingdom since the early 1920s when it first started doing work for British-owned companies. At first, their interests were handled through agents, but prior to the war, with extensive work for Anglo-Iranian Oil Company at Abadan and Haifa, Kellogg representatives were established in London to promote better liaison with the customer and to handle the purchase of materials from U.K. manufacturers. An office was established first in Bush House, Aldwych, and later in Stone House, Bishopsgate. This latter office was maintained throughout the war although in an inactive state.

Immediately following the end of the war new refinery installations were projected in the United Kingdom and other parts of the sterling area. The Kellogg office was reactivated and in view of the importance of the potential business, the decision was made to establish an office in London which could perform complete engineering and procurement services. As mentioned above, Kellogg International Corporation was formed in 1947 and the organization soon outgrew its offices in Stone House. New offices were acquired at 7–8 Chandos Street, in the West End, where the Corporation moved in 1952. Since then expansion has continued and the original space has been doubled by occupation of a new building adjoining the old.

The home of Kellogg International in Chandos Street, London, W.1.

The policy of Kellogg International Corporation London office is to develop and strengthen its personnel and to assume an ever-increasing responsibility for performing the services of engineer-contractor for the oil refining and chemical industry in Britain, in the sterling area, the Middle East, and on the Continent. The London organization can, in the relatively short term of its existence, point with pride to major accomplishments along this line amongst which can be listed the following projects:

(1) Three catalytic cracking units for British Petroleum in the United Kingdom.
(2) Two large olefin cracking units for Imperial Chemical Industries.
(3) A complete oil refinery for the Government Oil Refineries Administration in Baghdad, Iraq.
(4) A complete oil refinery for British Petroleum in Kwinana, Australia.
(5) A large catalytic cracking and polymerization unit for Compagnie Française de Raffinage, at Le Havre, France.
(6) A butadiene extraction unit for British Hydrocarbon Chemicals Company at Grangemouth, Scotland.
(7) A catalytic reforming unit for Raffinerie Belge de Pétroles in Antwerp, Belgium.

Other important projects currently being designed or erected include a third olefin cracking unit for ICI, and four catalytic reformers and three desulphurization units for BP and its associated companies. In each case, the London organization is able to take on an increasing degree of responsibility from its parent company, while still maintaining the important ties which enable it to take advantage of the latter's extensive know-how, experience, research, and development work.

★ ★ ★

USE OF ROAD REVENUES IN U.S.A.

It is recorded* that in the United States in 1956 "two further victories in the battle against highway fund diversion were chalked up". These were Louisiana and Montana, which joined those with constitutional amendments earmarking tax revenues from highway users for highway purposes. A total of 27 States now have such protection for their revenues from road taxation.

It is stated that during 1955 the amount of special taxes paid by highway users in the United States reached the record total of $4014 million, of which $2533 million or 63 per cent of the total was derived from state gasoline taxes. The allocation of this revenue during the years 1954 and 1955 is given in the following table:—

ALLOCATION OF HIGHWAY USER REVENUES IN THE U.S.A., 1954 AND 1955
(in million dollars)

	1954		1955	
	$	% *of total*	$	% *of total*
State highway work	2031	55·6	2259	55·3
Cost of collection ...	141	3·9	155	3·9
Highway police ...	110	3·0	127	3·2
Debt service ...	183	5·0	198	4·9
Local roads and streets	915	25·1	993	24·7
Non-highway purposes	269	7·4	282	7·0
	$3649	100·0	$4014	100·0

Detailed tables show that at least 22 States used none of their road tax revenues for non-highway purposes in 1955 and that the State to use the highest percentage of its revenue for such purposes was New Jersey with 36·7 per cent.

* *Tax Economics Bulletin*, 1956, **21**(6), Nov–Dec. American Petroleum Institute.

CONVEYANCE OF PETROLEUM SPIRIT

The Petroleum-Spirit (Conveyance by Road) Regulations 1957 (S.I. 1957/191), which comes into operation on 1 July, consolidate and amend the similar Regulations issued in 1939, 1947, 1948, 1949, and 1950. The principal amendment is in the inclusion of a new Regulation (No. 16) which relates to the precautions to be taken in connexion with the transfer of petroleum spirit from a carrying tank into a storage tank. The term "carrying tank" means the tank or tanks on a tank wagon or trailer designed for conveyance and excludes the fuel tank.

Regulation 16 provides for each storage tank to be clearly numbered; for each dipstick to be marked with the same number; for a filling pipe from a distant filling point to be so numbered; and stipulates rules to be observed by persons in charge of the receiving and delivering vessels. The type of certificate to be furnished for each delivery is specified.

Copies of the Regulations are obtainable from HMSO price 6*d*. net. It is understood that the certificate referred to will be available in book form from HMSO at the end of April.

★ ★ ★

ELECTRIC STRENGTH OF TRANSFORMER OIL

Amendment to IP 20/52

In order to maintain technical equivalence with BS 148:1951, for which Amendment No 3 has recently been issued, method IP 20/52 has been modified as follows:—

In Section 7 (a) the time the sample is allowed to stand for air bubbles to escape should be 20 minutes instead of 10 minutes.

★ ★ ★

Trade Literature, etc.

New Address

The British Laboratory Ware Association Ltd announce that their new address is 20 Queen Anne Street, London, W.1.

Tubes and Derricks

Stewarts and Lloyds announce that they have supplied various types of tubes and derricks for the *Evgenia Niarchos* and the *Spyros Niarchos*.

New Address for Badgers

E. P. Badger and Sons Ltd announces that the entire staff from its Battersea and Aldwych offices has moved into a new building at 20 Red Lion Street, London, W.C.1 (Telephone: CHAncery 3366).

Compoflex to Market Rigid Tubing

As a result of the acquisition of the entire share capitals of Rollo Hardy & Co Ltd and Tube Making Machines Ltd, the Compoflex Co, of 23–25 Northumberland Avenue, London, W.C.2, has extended its flexibles advisory and manufacturing facilities to include certain forms of rigid tubing.

New Oil Burner Subsidiary

Associated British Engineering Ltd, of 37–41 Bedford Row, London, W.C.1, announces the formation of a new subsidiary company, Newtherm Oil Burners Ltd, which will manufacture industrial and domestic oil burners on a large scale for home and overseas markets.

Arrangements have also been concluded for Woden Tools Ltd to act as sole sales concessionaires in the U.K. for A.B.E. domestic convector heaters only.

Fire Research Development

A new Research and Development Division has been established by the Pyrene Co Ltd. Its function will be to improve further co-ordination between the various fire research, development, and experimental activities carried on within the Company. The new arrangements are intended to facilitate the development and introduction of new products and the improvement of existing products.

Electronic Control and Measuring Equipment Catalogue

Airmec Ltd has recently published an attractive catalogue, profusely illustrated with photographs and diagrams, of its industrial electronic control and measuring equipment. A feature of the catalogue is that it is bound in a press-button folder so that future specifications, etc. can, from time to time, be inserted. Copies are obtainable on request to the Company at High Wycombe, Bucks.

Flame Arrestors

Specially designed flame arrestors for the flare stacks in the extension to the Kuwait oil refinery have been supplied by Ferguson and Timpson of London. The arrestors, which are intended to prevent flame flashing back into the gasbins, are designed to have a low-pressure drop characteristic so that only a very low pressure is required to force the gases through.

Pneumatic Tools in Holland

N.V. Chicago Pneumatiek, a new Netherlands subsidiary of Consolidated Pneumatic Tool Co Ltd, is at present under the control of the following directors: N. Readman, K. Zeevenhooven, and R. R. Parker. For the time being, the day to day management of the new Company will be carried out by Zeevenhooven & Co N.V., from their offices at Keenstraat 32, Rotterdam.

"Dag" Dispersions

Acheson Colloids have published the first issue of a new quarterly news sheet, entitled *Prospects*. Intended primarily but not exclusively for the benefit of present and potential users of "dag" dispersions, *Prospects* will include articles on the application and advantages of using "dag" products, test and technical data, hints on usage, news of new and successful applications, and, it is hoped, contributions from industrial users.

Copies will be mailed direct to production executives in the U.K.

Industrial and Commercial Photography

Photography at Work, recently issued by Kodak Ltd, illustrates some of the many uses of photography in industry and commerce. These include document copying, drawing office operations, radiography, industrial relations, work study, etc. A special catalogue of industrial X-ray material and equipment is also available from the Company at Victoria Road, Ruislip, Middlesex.

Oilfield Lighting Sets

Henry Meadows Ltd, of Wolverhampton, a member of The Associated British Engineering Group, announces that among its overseas orders is a repeat order for two 35-kW oilfield lighting sets. These will be supplied to Shell for use in Nigera. The repeat order is the result of experience gained with the first two sets.

Laboratory Apparatus Catalogue

The Griffin and George Group, which incorporates Griffin and Tatlock, W. & J. George and Becker, and Stanley Belcher and Mason, have recently completed the distribution of their new *Chemical Laboratory Apparatus Catalogue* 56*S*.

This profusely illustrated 700-page volume catalogues over 20,000 items, covering the general chemical apparatus requirements of those engaged in industry, education, and research.

Lift Trucks

The Hyster Company announces that LPG fuel systems are now available for a wide selection of its industrial trucks and lift trucks.

This company has recently published an informative 24-page booklet, entitled "How to Operate a Lift Truck". Using the two-colour cartoon technique, it is designed to appeal to beginners and experienced operators of lift trucks alike. Preventive maintenance, safety precautions, and basic materials handling are among the subjects dealt with.

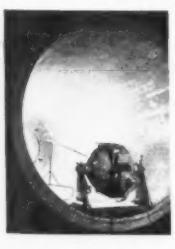
Copies are available by writing for Form 1214 from the Hyster Company, 2902 N. E. Clackamas Street, Portland 8, Oregon, U.S.A.

Inert Gas Generators

Inert gas generators, both gas and oil fired, are being used in increasing numbers in the petroleum and allied industries. The main reason is that inert gas can be produced on site at a much lower cost than that of bottled gas or of solid CO_2.

Details of several types of inert gas generators are given in Publication No. 64, which is available on application to W. C. Holmes & Co Ltd, P.O. Box B.7, Turnbridge, Sheffield.

Remote-control Radiographic Unit



One of the world's largest radiographic units operated by remote control is the Pantatron III (*left*), made by Nuclear Engineering Ltd, of Greenwich. Used for non-destructive testing of welds, castings, etc, a large source (10 curies) of Cobalt 60 costs about £60 and is useful even after 15 years' decay. Penetration for radiography is from 1 to 8 inches steel.

New Range of Electric Motors

The English Electric Co Ltd has recently introduced a new range of axially ventilated electric motors from ½ to 50 h.p. ratings. Their fixing dimensions are to the new BS draft, and they use class "E" insulation permitting a rise of 65 on 40° C ambient temperature. These features allow a smaller, lighter, and cheaper motor to be produced. In this photo, the managing director of the Company, H. G. Nelson, is seen with C. Horne, manager, Industrial Motors, inspecting the new machines at a recent preview.

New Molytone Greases

After considerable research and service tests, the range of Molytone greases, *i.e.* Molytone grease, Molytone L.M., Molytone X, and Molytone C, is being introduced in the U.K. and several other countries. This range of greases is based on special Bentone greases containing molybdenum disulphide.

The manufacturers (Rocol Ltd of Ibex House, Minories, London, E.C.3.) claim that these greases are more heat stable, more resistant to working, have better adhesion to metals, better water repellence, and less oil separation than other greases. It is also claimed that they have no melting point and can thus be used in conditions up to the point of inflammability of the oil.

Solartron Annual Review

It is the practice of The Solartron Electronic Group to publish an illustrated annual review of the Company's progress during the past year and to include a special survey and explanation of an important electronic topic.

This year the subject is "Electronics—The Spearhead of Automation"; by Bowman Scott, M.B.E., M.B.A. (Harvard), B.Sc. (Eng.), who writes "It seems likely that we shall seldom see completely new automatic factories being built from scratch, but rather a gradual integration of automatic devices into existing systems of mechanization, and only then when they are economic propositions."

Copies of *Solartron* 1956 are available on request to The Solartron Electronic Group Ltd, Thames Ditton, Surrey.

Cast Magnesium Anodes

Several types of cast magnesium anode for incorporation in the cathodic protection equipment of pipelines, ships, jetties, storage tanks, etc., have recently been introduced by Metal and Pipeline Endurance Ltd. The pipeline anodes, for example, are made with a tubular copper core which, it is claimed, ensures an excellent bond and electrical contact with the magnesium. In addition, a secure and permanent soldered joint may be made with the lead wire. This particular joint is protected by a filling of pitch insulation.

The anodes can also be supplied with galvanized steel cores, if required, and special types are available where sea water conditions are prevalent.

Enquiries will be welcomed by the Company at 22 Queen Anne's Gate, London, S.W.1.

SITUATIONS VACANT

PROJECT MANAGER
SALARY £3,000 P.A.

A leading Chemical Engineering Contracting Organization has a vacancy for a first-class man to take control of the construction of major chemical plants. This position offers scope for a person with wide experience in this field and he will be responsible for projects from initial design to final commissioning. Full particulars which will be treated in strictest confidence to Box No. 1112, *IP Review*.

Resident Engineer required for mechanical and plant erection work on new Oil Refinery and Chemical Plant Construction. Should be experienced in use of heavy lifting equipment, pipelines, etc., and control of labour. Commencing salary up to £2000 p.a. according to experience and qualifications. Please write in confidence, giving full particulars of past employers and contracts carried out to Box No. 1111, *IP Review*.

ESSO PETROLEUM COMPANY LIMITED
has further vacancies at Fawley Refinery for Science Graduates (with or without industrial experience).

Fawley is situated on the west side of Southampton Water, on the borders of the New Forest. Since 1949 there has been a programme of continuous development and expansion of Refinery capacity, and by 1958 the capital expenditure involved will have reached £68 millions.

Vacancies are for:—

CHEMICAL ENGINEERS for work in the Technical Department on process problems involving Distillation, Catalytic Cracking, Hydrofining, Chemical Treating, Lubricating oils, Utilities, etc.

CHEMISTS for work in the laboratories which includes process development studies, the introduction of new analytical techniques, especially physico-chemical methods, and statistical product quality evaluation.

The above posts carry responsibility for studying and advising on process unit operations, and allied planning, economic and engineering design problems. Continued expansion of the refinery gives excellent prospects for advancement and the jobs themselves are professionally satisfying. Graduates are given opportunities for fitting themselves for wider responsibilities by various forms of training, *e.g.* technological courses, rotation between different jobs, and management training.

TECHNICAL ASSISTANTS. There are also a number of vacancies for candidates of Inter BSC or HNC standard or similar.

Commencing salaries for all posts depend on age, qualifications, and experience. All posts are progressive. There is a voluntary contributory Pension Plan, which is amongst the best and most comprehensive of such schemes. Working conditions are congenial in a modern industrial setting. There are excellent recreational facilities of all kinds. All enquiries will be received in strict confidence, and should be sent to the Employee Relations Superintendent at the above address marked "Technical Staff Recruitment".

Forthcoming Meetings

THE INSTITUTE

(*At* 26 *Portland Place, London, W.*1, 5.30 *p.m.—tea* 5 *p.m.*)

The Properties and Use of Bitumen in Road Making. A. R. Lee, Ph.D., A.R.C.S., F.Inst.P., and J. H. Nicholas, and P. C. Leaver. **1 May**

(*At Grand Hotel, Folkestone*)

Summer Meeting **29 May–1 June**

IP LONDON BRANCH

(*At* 26 *Portland Place, London, W.*1, 6 *p.m.—tea* 5.30 *p.m.*)

The Place of the Chemical Engineer in the Petroleum Refining Industry. H. E. F. Pracy, B.A., M.I.Chem.E., F.Inst.Pet. **25 April**

IP NORTHERN BRANCH

(*At the Engineers' Club, Albert Square, Manchester* 2, 6.30 *p.m.*)

Joint Meeting with the N.W. Branch of the Institution of Chemical Engineers.

Forty Years on—If the Oil Wells run Dry. Prof. E. S. Sellers. **16 April**

IP STANLOW BRANCH

(*At the Grosvenor Hotel, Chester*, 7.30 *p.m.*)

Joint Meeting with The Institution of Chemical Engineers.

An Examination of Some Unusual Pumping Problems and of their Solution. N. Tetlow, B.Sc., A.M.Inst.C.E., M.I.Mech.E., M.I.E.E., M.Inst.Pet. **17 April**

OTHER SOCIETIES

THE INSTITUTION OF MECHANICAL ENGINEERS

(*At* 1 *Birdcage Walk, Westminster, London, S.W.*1. 6 *p.m.—tea* 5.30 *p.m.*)

Diesel Engine Lubricants—Their Selection and Utilization, with Particular Reference to Oil Alkalinity. A. Dyson, L. J. Richards, and K. R. Williams. **26 April**

THE INSTITUTE OF FUEL

(*At the Institution of Civil Engineers, Great George Street, London, S.W.*1, 5.30 *p.m.—tea* 5 *p.m.*)

Fuel Uses and Fuel Economy in Italy. Carlo Padovani. **Early in May**

GEOLOGICAL SURVEY AND MUSEUM, LONDON.
GEOPHYSICIST. The Civil Service Commissioners invite applications from men for this pensionable post (graded as Geologist or Senior Geologist according to age and qualifications) under the Department of Scientific and Industrial Research for work connected with geophysical surveys in the field.

Age at least 26 on 1 July 1957 for appointment as Senior Geologist, and at least 21 and under 30 (under 31 for established members of Experimental Officer Class) on that date, with extension for regular service in H.M. Forces, for appointment as Geologist.

Candidates must have, or obtain in summer 1957, 1st or 2nd class Honours degree in Geology, or Geophysics, or Physics, or Mathematics, with at least first year standard both in geology and in Physics or Mathematics or equivalent qualification. Exceptionally, other candidates admitted if otherwise well qualified. Experience in Applied Geophysics an advantage. For appointment as Senior Geologist at least 3 years' post-graduate or other approved experience necessary in addition.

Salary scales:

Geologist	— £605–£1,055	Provision for starting pay above minimum.
Senior Geologist	— £1135–£1345	Starting pay normally at minimum.

5-day week; promotion prospects.

Further particulars and application form from Civil Service Commission, Scientific Branch, 30 Old Burlington Street, London, W.1., quoting S4674/57/8. Completed application forms should be returned by 15 April 1957.

A SECTION OF ONE OF OUR DESIGN OFFIC

Our Design facilities are at your Service

With some of the largest and best equipped design offices in this Country, the Matthew Hall organisation undertakes the complete design of large chemical and oil refinery projects.

THE

MATTHEW HALL

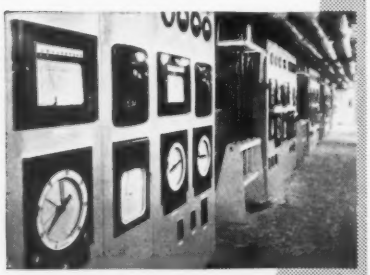
GROUP OF COMPANIES

Honeywell MICRO-Precision Switches contribute to the operating efficiency of this pallet truck manufactured by Lansing-Bagnall, Basingstoke.

Two ElectroniK Recorders measured temperatures inside and outside De Havilland's Comet 3 during its round-the-world test flight.

Instruments, Electronics, and Automation Exhibition, Olympia, 7-17 May

You will find
instrumentation
for
your every need
and purpose
on Stand 410

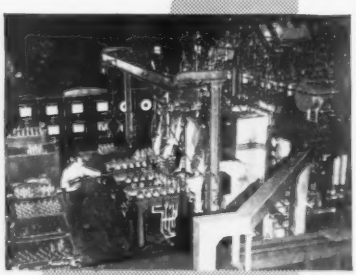


110 ElectroniK instruments measure and control temperatures at I.C.I. 'Terylene' Plant—Wilton, Yorkshire.

Honeywell
BROWN INSTRUMENTS

First in Controls

Honeywell-Brown Ltd., 1 Wadsworth Rd., Perivale, Middlesex. (PERivale 5691). Branch Offices in principal cities of Britain and throughout the world.



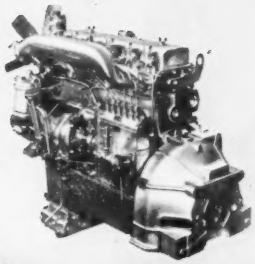
Honeywell Instrumentation on Europe's largest 3-Track Continuous Gas Carburising Furnace—Ford Motor Co. Dagenham.

Honeywell Pneumatic Receivers record and control the stabilising and fractionating of naphtha from the atmospheric pipestills at the Esso Petroleum Co's Refinery at Fawley, Southampton.

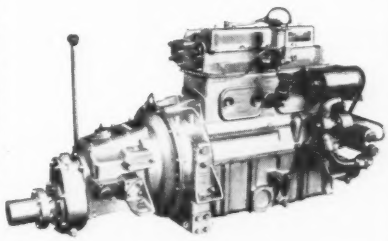
PERKINS DIESEL AND POWER STANDARDIZATION

Wherever you use power — in the plant, on site, for transport or marine use, Perkins Diesel engines mean power standardization—and greater economy all round. Maximum interchangeability of engine parts means fewer spares, easier maintenance and quicker turn round on repairs. No wonder Perkins Diesels are at work on 423 applications, in 143 different countries. Perkins service is world-wide too. Perkins Overseas Companies and distributors and the manufacturers who standardize on Perkins' engines, ensure that Perkins Service and spares are readily available.

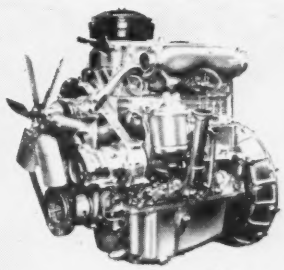
THE L4 (I) POWER PACK. This industrial power pack forms an extremely versatile unit which can easily be moved or mounted on a large variety of plant. The L4 (I) engine of 53 B.H.P. at 1,800 r.p.m. although extremely robust is not heavy. Approximate Shipping Specifications: The complete Power Pack weighs 1,450 lbs. net, 1,700 lbs. gross. Dimensions 5′4″ x 4′10″ x 2′.



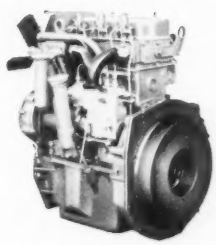
P6 (V) Automotive Diesel Engine



L4 (M) Marine Diesel Engine



P4 (I) Industrial Diesel Engine



P3 (TA) Tractor Diesel Engine

Full technical details of the Perkins range of diesel engines are available on request.

Perkins HIGH QUALITY DIESELS

The Diesel Engine with the clean exhaust

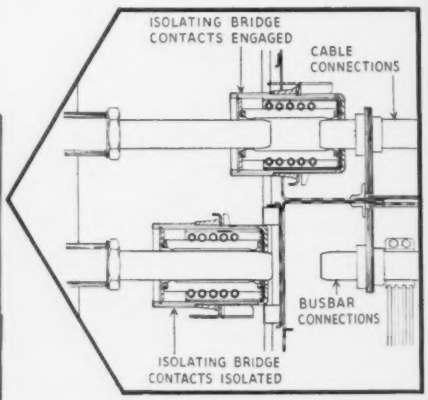
FOR INDUSTRIAL, VEHICLE, AGRICULTURAL AND MARINE APPLICATIONS

F. PERKINS LTD., PETERBOROUGH Phone: Peterborough 5341

89G

Air-break switchgear for process plant control

incorporating 'ISOLECTOR'



'ENGLISH ELECTRIC' Class 'E' Air-break Switchgear incorporating 'Isolector' represents a great advance in switchgear practice.

With the 'Isolector' mechanism it is no longer necessary to withdraw the truck from the cubicle to isolate the breaker. Isolation facilities, together with the cable earthing switch fitted to each unit, are all readily operated from the fool-proof interlocking gate at the front of the unit.

The 'Isolector' mechanism simplifies busbar selection in duplicate busbar units. These are available in the same cubicle dimensions as single busbar units.

A mimic diagram provides *mechanical* circuit indication and is clearly visible with the door open or closed.

The ratings for Class 'E' Switchgear are: Breaking Capacity - 150 MVA at 2.3 kV, Maximum service voltage - 3,300 volts, Maximum current rating - 2,000 amps. The gear is housed in a handsome, dust-proof cubicle and has excellent main and multi-core cabling facilities.

'ENGLISH ELECTRIC'

STAND E 8

Electrical Engineers Exhibition

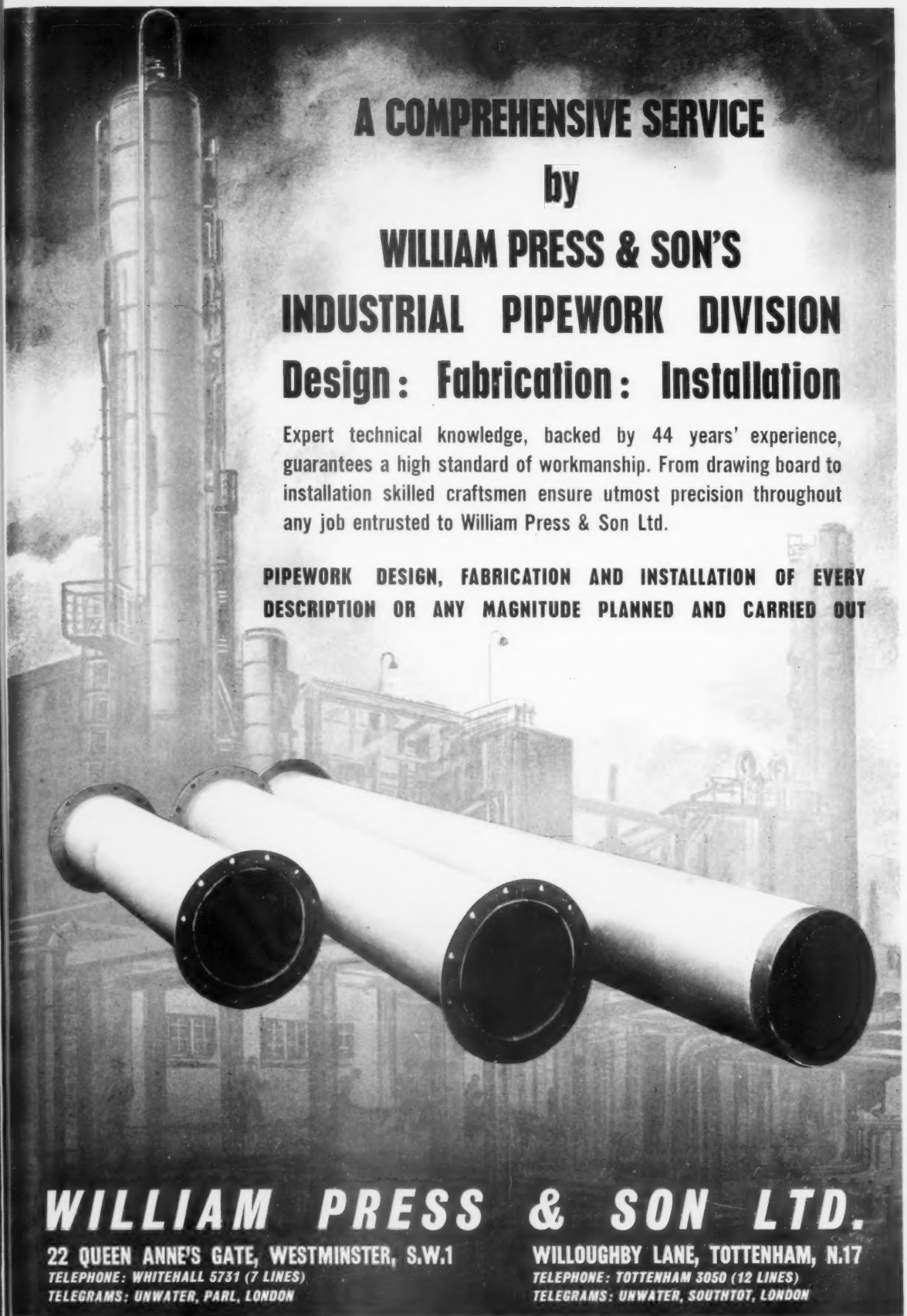
where 'ENGLISH ELECTRIC' are also showing
Fusegear, Transformers, Welding Equipment and Electrodes, Domestic Appliances, Industrial Motors, F.H.P. Motors, Meters, Relays and Instruments.

THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Switchgear Department, Liverpool

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

SGL.23 B



A COMPREHENSIVE SERVICE
by
WILLIAM PRESS & SON'S
INDUSTRIAL PIPEWORK DIVISION
Design : Fabrication : Installation

Expert technical knowledge, backed by 44 years' experience, guarantees a high standard of workmanship. From drawing board to installation skilled craftsmen ensure utmost precision throughout any job entrusted to William Press & Son Ltd.

PIPEWORK DESIGN, FABRICATION AND INSTALLATION OF EVERY DESCRIPTION OR ANY MAGNITUDE PLANNED AND CARRIED OUT

WILLIAM PRESS & SON LTD.

22 QUEEN ANNE'S GATE, WESTMINSTER, S.W.1
TELEPHONE: WHITEHALL 5731 (7 LINES)
TELEGRAMS: UNWATER, PARL, LONDON

WILLOUGHBY LANE, TOTTENHAM, N.17
TELEPHONE: TOTTENHAM 3050 (12 LINES)
TELEGRAMS: UNWATER, SOUTHTOT, LONDON

HEAT FOR SCIENCE AND INDUSTRY 5

HEATING MANTLES

(Patented)

This range of Electrothermal Heating Mantles now covers all flask sizes up to 200 litres—round or flat bottomed flasks are equally accommodated. Available from your usual Laboratory Suppliers.

GUARANTEED FOR 12 MONTHS

Please request D.S.I.R. Report No. 50

ELECTROTHERMAL

ENGINEERING LIMITED, 270 NEVILLE ROAD, LONDON, E.7

Telephone: GRAngewood 9911

STANDARD METHODS
FOR
TESTING PETROLEUM
AND
ITS PRODUCTS

(Excluding Engine Test Methods for Rating Fuels)

(SIXTEENTH EDITION, 1957)

772 pages 186 Diagrams

Price 40s. post free

Obtainable from

The Institute of Petroleum
Manson House, 26 Portland Place, London, W.1

IP ENGINE TEST METHODS
FOR RATING FUELS

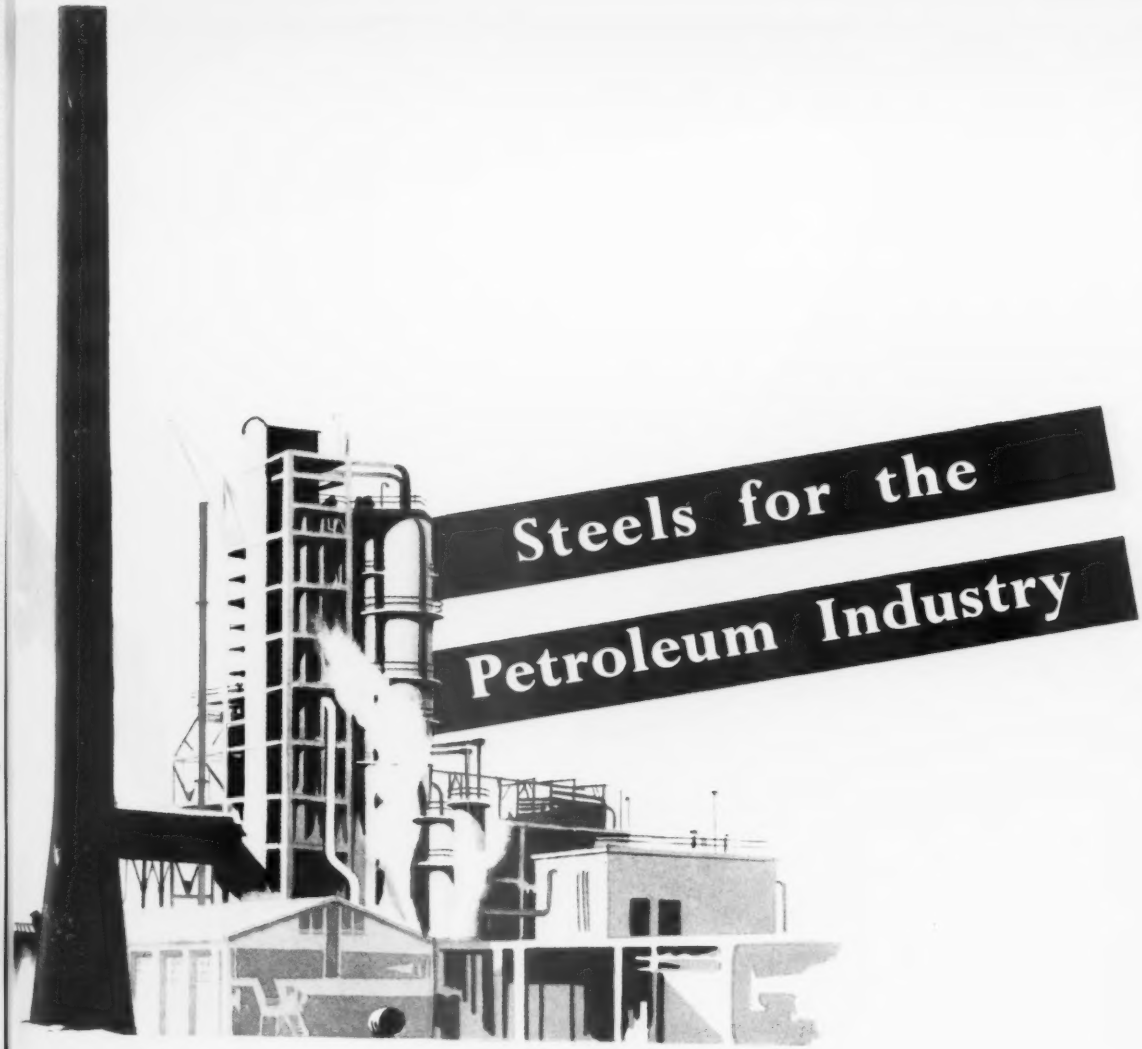
(FIRST EDITION—1955)

90 pages 9 Diagrams

Price 20s. post free

Obtainable from

The Institute of Petroleum
Manson House, 26 Portland Place, London, W.1



COUNCIL OF BRITISH MANUFACTURERS OF PETROLEUM EQUIPMENT
CBMPE
MEMBER

The United Steel Companies Limited

SHEFFIELD ENGLAND

THE UNITED STEEL COMPANIES LTD

APPLEBY FRODINGHAM STEEL COMPANY. SAMUEL FOX & COMPANY LIMITED.
STEEL PEECH & TOZER. UNITED COKE & CHEMICALS COMPANY LIMITED. WORKINGTON IRON & STEEL COMPANY

US73b

A challenge to alert minds

The great and swiftly growing petroleum chemicals industry, in which the Shell Chemical Company has always played a leading and pioneering part, is the one industry essential to practically all other industries. It is meeting a substantial part of the nation's chemical needs and opening up a new age of more efficient processing and better products. As Shell scientists delve ever deeper into petroleum, new base materials are being developed—materials that reveal fresh worlds of possibility for questing minds, that are stimulating new ways of thinking in dozens of industries, from surface coatings to agriculture, from laundering to electronics. Here, for the adventurous, is the inspiration for new departures, to capture markets and enrich living standards. In this new world of chemicals . . . *you can be sure of Shell.*

SHELL

Text: 3

SHELL CHEMICAL COMPANY LIMITED, MARLBOROUGH HOUSE, 15-17 GREAT MARLBOROUGH ST., LONDON, W.1

Fastest Route to Profits in Petroleum Processing

The investor wants results—and wants them quickly. Not until the petrochemical producer starts to produce, or the refinery is put on stream, does he see any return on his investment: and as a result he measures the efficiency of an engineering organisation by the time which elapses between the signing of the contract and the first production from the plant.

The Kellogg organisation is at the service of industry anywhere in the world. Customers know that by entrusting their engineering requirements to Kellogg they are drawing on fifty years' experience with processes and process equipment, on a reputation for flexibility and economy in planning, and on unrivalled facilities for construction, procuring of materials and skilled labour, and training of local personnel. In addition, there is the unique background provided by the Kellogg associate companies, with their wide knowledge and full understanding of the local problems facing petroleum processors throughout the world.

The Kellogg International Corporation staff is in the unique position of being able to draw on this unmatched reservoir of world-wide experience, but at the same time execute at Kellogg House, London, the engineering, procurement and construction planning for plants in Europe, the Middle East, the Far East and the United Kingdom. In addition the K.I.C. staff assists the sister Kellogg organisation in other parts of the world by procuring material in the United Kingdom and shipping it to foreign construction sites.

You are invited to consult with the Kellogg International Corporation concerning your problems of petroleum refining or petrochemical processing.

THE M.W. KELLOGG COMPANY

THE CANADIAN KELLOGG COMPANY LTD

KELLOGG INTERNATIONAL CORPORATION

KELLOGG PAN AMERICAN CORPORATION

SOCIETE KELLOGG

COMPANHIA KELLOGG BRASILEIRA

COMPANIA KELLOGG DE VENEZUELA

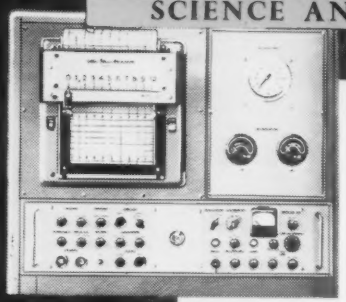
M KELLOGG W

Kellogg International Corporation

KELLOGG HOUSE · 7-8 CHANDOS STREET · CAVENDISH SQ · LONDON · W.1

SOCIETE KELLOGG · PARIS
THE CANADIAN KELLOGG COMPANY LTD · TORONTO
KELLOGG PAN AMERICAN CORPORATION · NEW YORK
COMPANHIA KELLOGG BRASILEIRA · RIO DE JANEIRO
COMPANIA KELLOGG DE VENEZUELA · CARACAS
Subsidiaries of
THE M. W. KELLOGG COMPANY
NEW YORK

SCIENCE AND THE STEEL TUBE AGE : 2



QUANTOMETER

In the great, modern steel and tube works of Stewarts and Lloyds at Corby the daily production of 2,700 tons of steel calls for rapid and accurate analysis of samples.

Chemical analysis has to some extent been replaced by the photographic spectrograph but to meet the need for still greater speed there is now in use at Corby an automatic direct-reading spectrographic analyser known as a Quantometer.

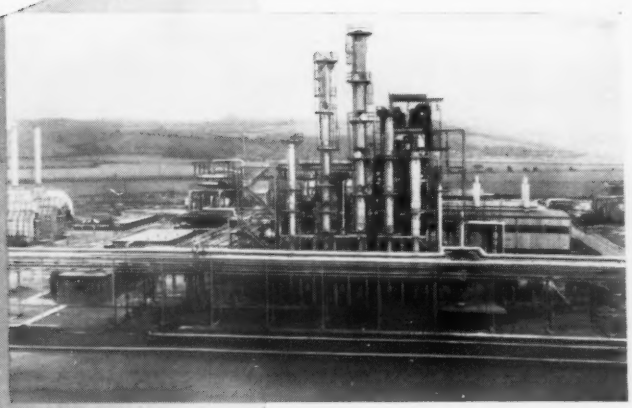
A small sample of steel, taken during a melt, is dispatched to the laboratory by pneumatic conveyor and an electric spark is struck between the sample and a counter electrode. The light from the spark is focused upon a special diffraction grating which produces an extended spectrum. The significant spectral lines fall on photomultipliers which measure their density. A quantitative assessment of the amount of each element is then recorded upon a chart (visible in the small illustration). The whole operation takes less than two minutes and this system provides a constant and rapid check on the quality of the steel.

STEWARTS AND LLOYDS
LIMITED
GLASGOW · BIRMINGHAM · LONDON

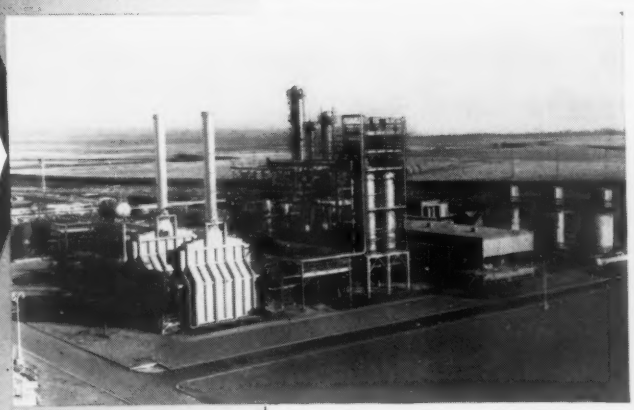
S&L

RECENT WORK in Petrochemicals

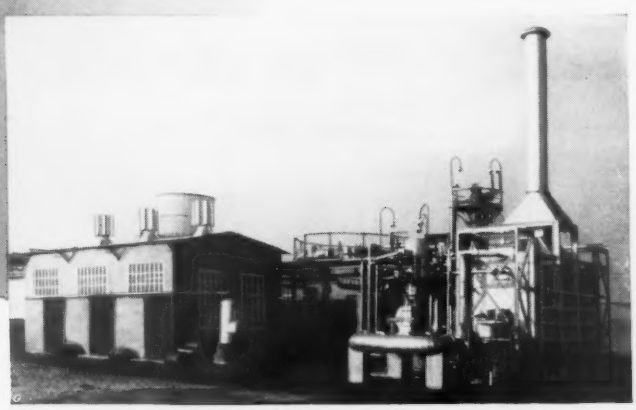
These are examples of Badger-built Petrochemicals plants commissioned within the past six months. Their design is the product of many years of experience and takes advantage of the latest American developments available to us through our U.S affiliate.



ETHYLENE FROM NAPHTHA—U.K.
(By Courtesy of British Hydrocarbon Chemicals Ltd.)



* SYNTHETIC ETHANOL—U.K.
(By Courtesy of British Hydrocarbon Chemicals Ltd.)



ETHYLENE FROM ETHANE—FRANCE

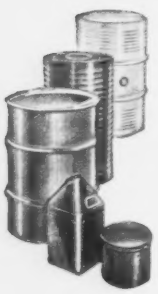
**Process Licensed by Shell Development Company*

E. B. BADGER & SONS LIMITED

20, RED LION STREET, LONDON, W.C.1

Affiliated with STONE & WEBSTER ENGINEERING CORPORATION, U.S.A.

METAL CONTAINERS



weather the weather!

METAL CONTAINERS LTD., 17 WATERLOO PLACE, PALL MALL, LONDON
WORKS: ELLESMERE PORT & RENFREW · ASSOCIATED COMPANIES OVERSEAS

M-W.119